

FOURTEEN  
*YEARS ON LINE*









American Hoist and Derrick Company,  
St. Paul.

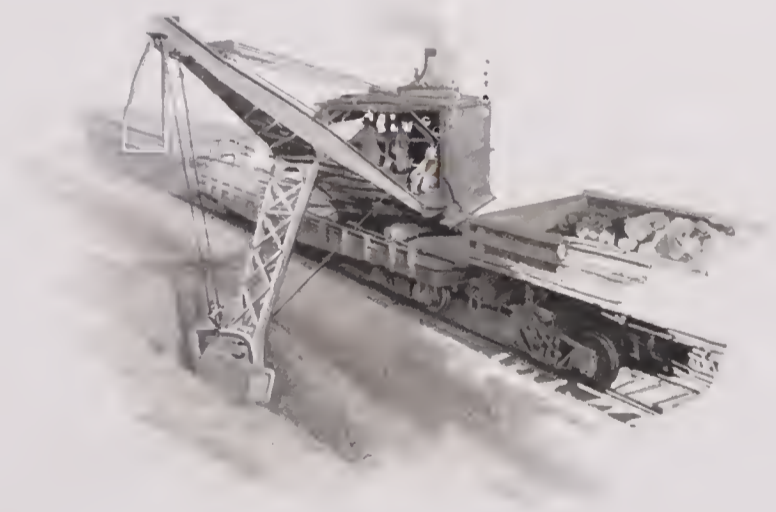
# FOURTEEN *YEARS ON LINE*

BEING A RECORD  
*of*  
FOURTEEN YEARS'  
SERVICE  
*by the*  
AMERICAN RAILROAD  
DITCHER



1920

AMERICAN HOIST & DERRICK  
COMPANY  
*St. Paul, Minn.*



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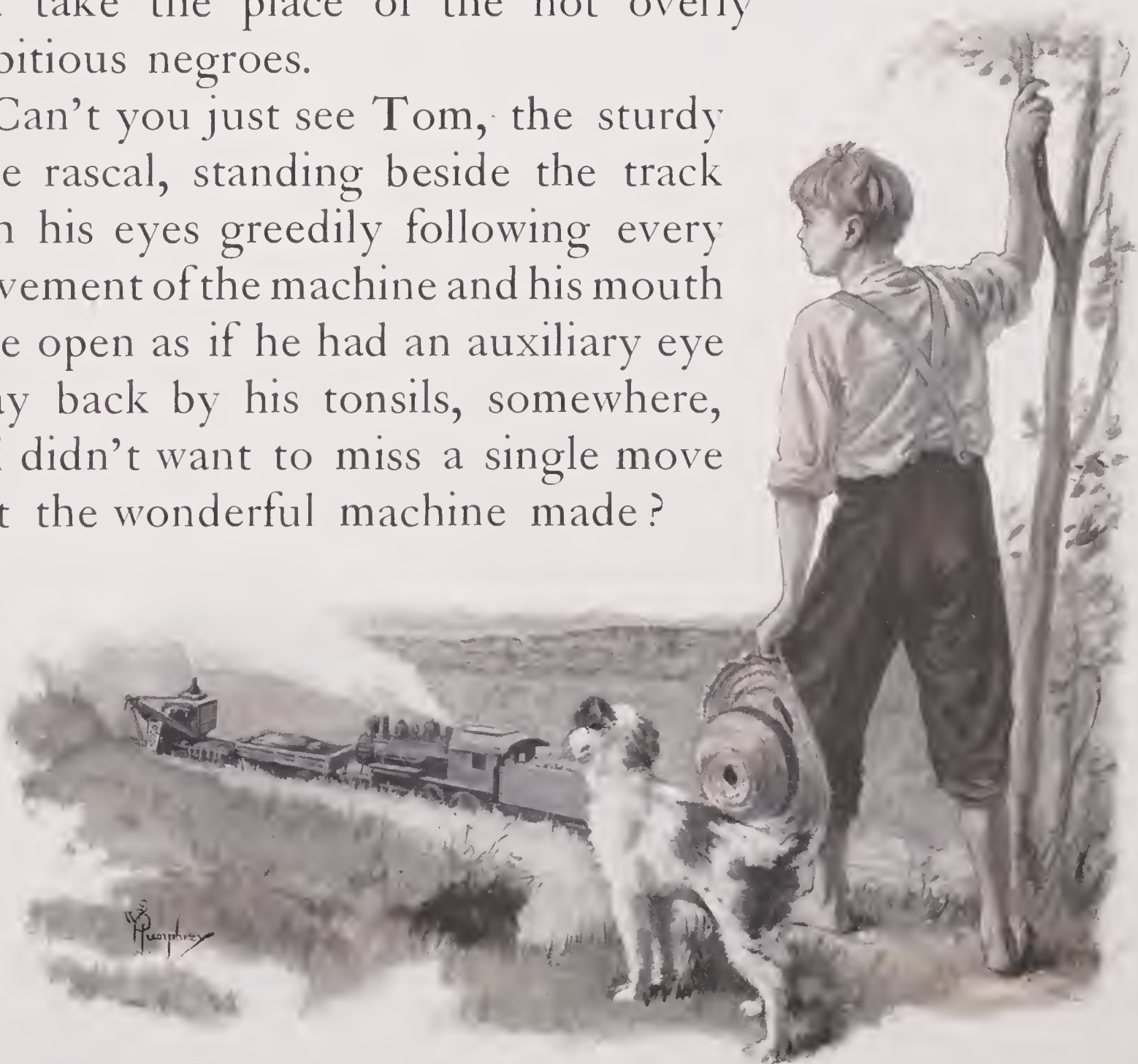
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IF TOM SAWYER HAD ONLY BEEN  
PLAYING "HOOKEY" DOWN BY THE  
"KATY" TRACKS IN HANNIBAL, MIS-  
SOURI, ON A CERTAIN SUNSHINY MAY  
DAY IN 1905, WHAT A TALE HE COULD  
HAVE TOLD AUNT POLLY AT THE  
SUPPER TABLE THAT NIGHT

**I**NDEED he might, without overdrawing the facts, have made her none too severe anger over his latest escapade fade away into wondering curiosity at the mechanical marvel, all shiny and bright with paint, which the old reliable "Katy" had bought to dig the ditches along the tracks and take the place of the not overly ambitious negroes.

Can't you just see Tom, the sturdy little rascal, standing beside the track with his eyes greedily following every movement of the machine and his mouth wide open as if he had an auxiliary eye away back by his tonsils, somewhere, and didn't want to miss a single move that the wonderful machine made?



And as every boy is a hero worshipper, and Tom certainly was all boy, how he would have admired Mr. C. M. Hoes, the operator of the machine! The wonderful magician, who, by pulling a lever, could send the big shovel plunging into a bank of clay and dig out about a thousand, million, trillion bushels, more or less, in one swipe. And, no doubt, about that time Tom would have registered a solemn vow that as soon as he grew up and didn't have to play "hookey" to avoid school, you betcha he was going to be a ditcher operator himself. It beat being a pirate all hollow.

And, to tell the truth, there was real cause for wonder in what Tom would have seen, for the first American Railroad Ditcher, the machine which was to revolutionize right-of-way ditching methods, was just starting out on a career which now, after 14 years, reads like a fairy tale. It is not a fairy tale, however, but a true story of remarkable achievement which has saved, no one can figure out how many millions of dollars, for the railroads. And the most wonderful thing about it all is, that the very first machine built, the one that was installed at Hannibal, Missouri, in May, 14 years ago, is still working every day, and, as the

performance figures which we print on a succeeding page conclusively show, not taking a back-seat for the newest American out of the shop, although the latter shows many changes and improvements, and is, of course, a much better piece of mechanism.

Right at the "jump-off" this wonderful old machine showed the stuff that was in it; in a four days' ditching campaign following its installation, it took 1337 yards out of the ditches, averaging 338 yards a day, or 58 yards an hour. The cost per yard, not including cost of work train, was 3.3 cents a yard.

The results of this premier performance of the American Railroad Ditcher become all the more wonderful when we remember that the men who were breaking-in this first ditcher were pioneering in the real sense of the word, and that,

naturally, there was quite a bit of time lost during the first week or so, while the men in charge familiarized themselves with the machine and its great possibilities.

Besides its wonderful 14-year record, there is something else remarkable about this veteran ditcher and that is, Mr. C. M. Hoes, the operator. Mr. Hoes is, beyond

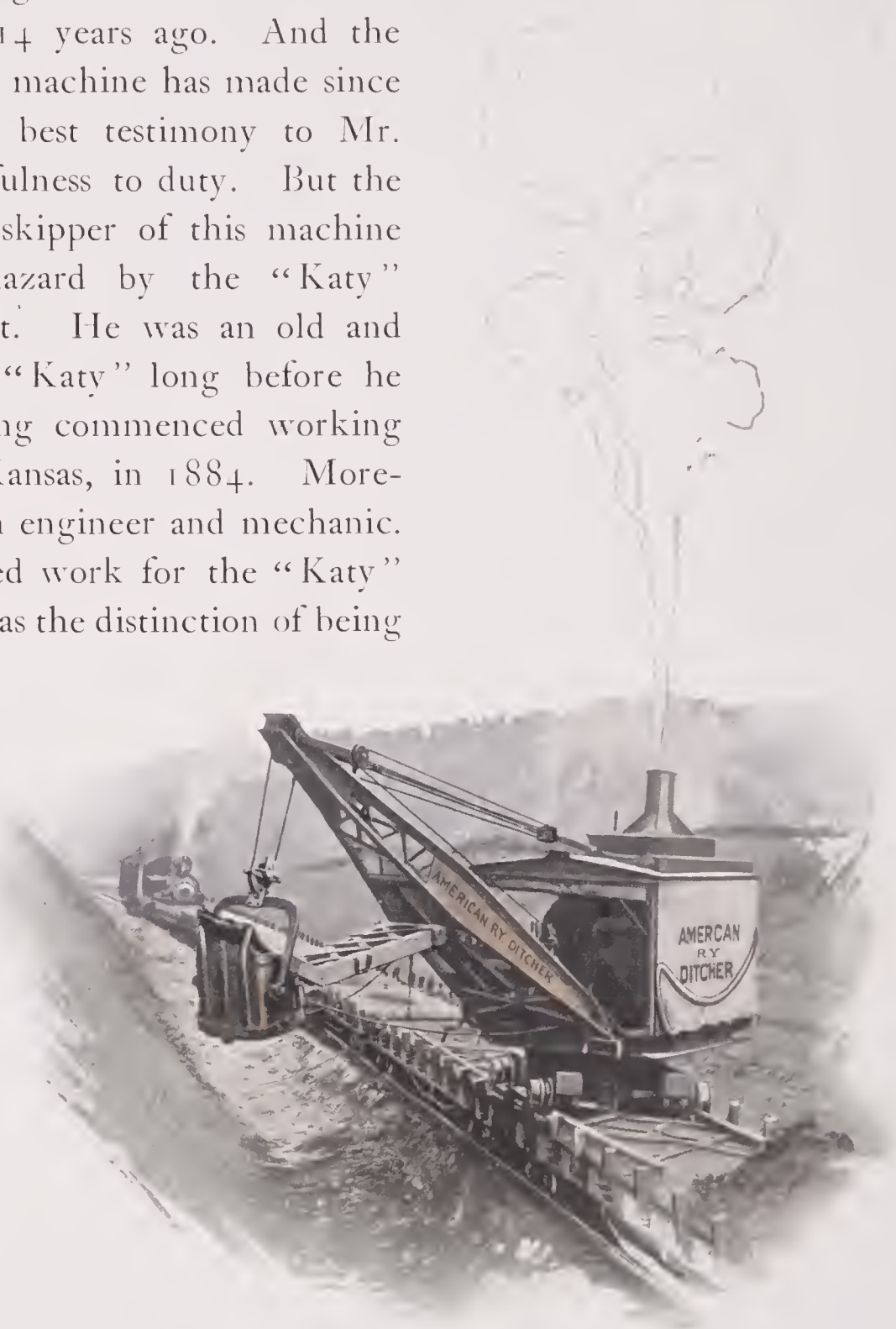


question, the dean of all ditcher operators, for it was he who took charge of this old American when it was installed 14 years ago. And the great record which this machine has made since it was installed is the best testimony to Mr. Hoes' ability and faithfulness to duty. But the choice of Mr. Hoes as skipper of this machine was not made hap-hazard by the "Katy" officials in charge of it. He was an old and tried employee of the "Katy" long before he took the ditcher, having commenced working for them at Parsons, Kansas, in 1884. Moreover, he was a thorough engineer and mechanic. In fact, he commenced work for the "Katy" as a machinist, and he has the distinction of being the first traveling air inspector the M. K. & T. Railway had. Mr. Hoes also worked as a locomotive engineer, and still holds engineer rights in Texas. For several years he was round-house foreman at Smithville, Texas, and it was from this position that

he was recalled in the Spring of 1905 to take charge of the first American Railroad Ditcher, which position he has filled with conspicuous success ever since. On account of his long acquaintance with the American Railroad Ditcher, and his thorough mechanical knowledge, we are particularly proud of Mr.

Hoes' statement that the American Railroad Ditcher is the best built and best working machine of its kind.

Time and again Mr. Hoes has been offered a new machine, but he confesses a real affection for the old American and has declined the skippership of several new



*The* AMERICAN RAILROAD DITCHER

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C. M. Hoes

FOURTEEN YEARS ON LINE

| Missouri, Kansas & Texas Lines  |           |           |                                       |                     |                       |            |              |            |              |        |         |            |          |         |                |            |         |
|---|-----------|-----------|---------------------------------------|---------------------|-----------------------|------------|--------------|------------|--------------|--------|---------|------------|----------|---------|----------------|------------|---------|
| Operation of <del>Steam Shovel</del> Ditcher No. 57 for Period <u>Sept 1</u> to <u>Sept 30</u> 1917 |           |           |                                       |                     |                       |            |              |            |              |        |         |            |          |         |                |            |         |
| <u>Choctaw</u> Division   |           |           |                                       |                     |                       |            |              |            |              |        |         |            |          |         |                |            |         |
| Date  | Location  |           | Kind of Material                      | Feet Worked In Feet | Average Hour In Miles | Loaded     |              | Unloaded   |              | Hours  |         | Cost       |          |         |                |            | Weather |
|   | Mile Post | Mile Post |                                       |                     |                       | No of Cars | No of Cu Yds | No of Cars | No of Cu Yds | Worked | Delayed | Labor      | Supplies | Rentals | Other Expenses | Total      |         |
| 1   | 618       | 619       | Brick                                 |                     | 0.8                   |            | 360          |            | 360          | 9.50   | 2.40    | 49.00      | 11.04    | 19.41   |                | 79.45      | Hot     |
| 2   |           |           | (Sunday)                              |                     |                       |            |              |            |              |        |         | 9.00       |          | 5.66    |                | 14.66      |         |
| 3   | 618       | 619       | Clay                                  |                     | 0.8                   | 4.00       | 4.00         | 4.00       | 4.00         | 9.45   | 2.45    | 49.00      | 11.04    | 19.41   |                | 79.45      |         |
| 4   | 618       | 619       | Red Clay                              |                     | 0.8                   | 4.00       | 4.00         | 4.00       | 4.00         | 10.10  | 2.20    | 49.00      | 11.04    | 19.41   |                | 79.45      |         |
| 5   | 618       | 619       | "                                     |                     | 0.8                   | 2.40       | 2.40         | 2.40       | 2.40         | 10.30  | 2.00    | 49.00      | 11.04    | 19.41   |                | 79.45      |         |
| 6   |           |           | Red Clay                              |                     | 0.8                   | 4.00       | 4.00         | 4.00       | 4.00         | 9.50   | 2.40    | 49.00      | 11.04    | 19.41   |                | 79.45      |         |
| 7   |           |           | Clay                                  |                     | 1.0                   | 4.00       | 4.00         | 4.00       | 4.00         | 8.50   | 2.40    | 49.00      | 11.04    | 19.41   |                | 79.45      |         |
| 8   |           |           | Clay                                  |                     | 1.0                   | 3.20       | 3.20         | 3.20       | 3.20         | 9.20   | 2.40    | 49.00      | 11.04    | 19.41   |                | 79.45      |         |
| 9   |           |           | (Sunday)                              |                     |                       |            |              |            |              |        |         | 9.00       |          | 5.66    |                | 14.66      |         |
| 10  |           |           | (Moving From Okla. to Okla.)          |                     |                       |            |              |            |              |        |         | 51.00      | 13.04    | 19.41   |                | 83.45      |         |
| 11  | 517       | 518       | Clay                                  |                     | 1.0                   | 3.60       | 3.60         | 3.60       | 3.60         | 10.30  | 3.00    | 53.50      | 13.04    | 19.41   |                | 85.95      |         |
| 12  |           |           |                                       |                     | 1.0                   | 1.60       | 1.60         | 1.60       | 1.60         | 11.00  | 1.00    | 51.00      | 15.04    | 19.41   |                | 85.45      | Cool    |
| 13  |           |           |                                       |                     | 1.0                   | 2.00       | 2.00         | 2.00       | 2.00         | 8.00   | 5.00    | 49.00      | 15.04    | 19.41   |                | 83.45      | Hot     |
| 14  |           |           | General Work on Paving Track at Okla. |                     |                       |            |              |            |              | 13.00  |         | 46.00      | 15.04    | 19.41   |                | 80.45      |         |
| 15  | 517       | 518       |                                       |                     | 0.3                   | 2.00       | 2.00         | 2.00       | 2.00         | 8.00   | 5.00    | 51.00      | 15.04    | 19.41   |                | 85.45      |         |
| 16  |           |           | (Sunday)                              |                     |                       |            |              |            |              |        |         |            |          | 5.66    |                | 5.66       |         |
| 17  | 516       | 518       | Clay                                  |                     | 0.5                   | 1.00       | 1.00         | 1.60       | 1.60         | 6.35   | 5.25    | 41.00      | 13.04    | 19.41   |                | 73.45      | FAIR    |
| 18  | 520       | 521       |                                       |                     | 0.3                   | 1.60       | 1.60         | 1.60       | 1.60         | 5.50   | 6.40    | 38.00      | 13.04    | 19.41   |                | 71.45      | Cloudy  |
| 19  |           |           |                                       |                     | 0.3                   | 3.20       | 3.20         | 3.20       | 3.20         | 4.20   | 6.30    | 46.00      | 13.04    | 19.41   |                | 44.45      | FAIR    |
| 20  |           |           |                                       |                     | 0.3                   | 2.40       | 2.40         | 2.40       | 2.40         | 6.30   | 6.00    | 41.00      | 13.04    | 19.41   |                | 73.45      |         |
| 21  |           |           |                                       |                     | 0.3                   | 3.60       | 3.60         | 3.60       | 3.60         | 8.15   | 4.45    | 39.00      | 13.04    | 19.41   |                | 71.45      |         |
| 22  |           |           |                                       |                     |                       | 3.20       | 3.20         | 3.20       | 3.20         | 7.15   | 5.15    | 39.00      | 13.04    | 19.41   |                | 71.45      |         |
| 23  |           |           | (Sunday)                              |                     |                       |            |              |            |              |        |         |            |          | 5.66    |                | 5.66       |         |
| 24  | 520       | 521       | Clay                                  |                     | 0.3                   | 4.00       | 4.00         | 4.00       | 4.00         | 7.10   | 5.05    | 39.00      | 13.04    | 19.41   |                | 71.45      |         |
| 25  |           |           |                                       |                     | 0.3                   | 4.00       | 4.00         | 4.00       | 4.00         | 9.00   | 4.00    | 39.00      | 13.04    | 19.41   |                | 71.45      |         |
| 26  |           |           |                                       |                     | 0.3                   | 2.00       | 2.00         | 2.00       | 2.00         | 8.55   | 3.20    | 39.00      | 13.04    | 19.41   |                | 71.45      | Stormy  |
| 27  |           |           |                                       |                     |                       |            |              |            |              | 11.00  |         | 8.00       |          | 5.66    |                | 13.66      |         |
| 28  | 520       | 521       | Clay                                  |                     |                       | 1.20       | 1.20         | 1.20       | 1.20         | 4.55   | 7.15    | 39.00      | 13.04    | 19.41   |                | 71.45      | Clear   |
| 29  |           |           |                                       |                     |                       |            |              |            |              | 11.00  |         |            |          | 19.41   |                | 19.41      |         |
| 30  |           |           | (Sunday)                              |                     |                       |            |              |            |              |        |         | 6.00       |          | 5.66    |                | 11.66      |         |
| Total   |           |           |                                       |                     |                       | 62.0       | 62.0         |            |              |        |         | \$ 1042.50 | 293.92   | 497.80  |                | \$ 1837.22 | 30      |

After 12 years on line the first American performed like this

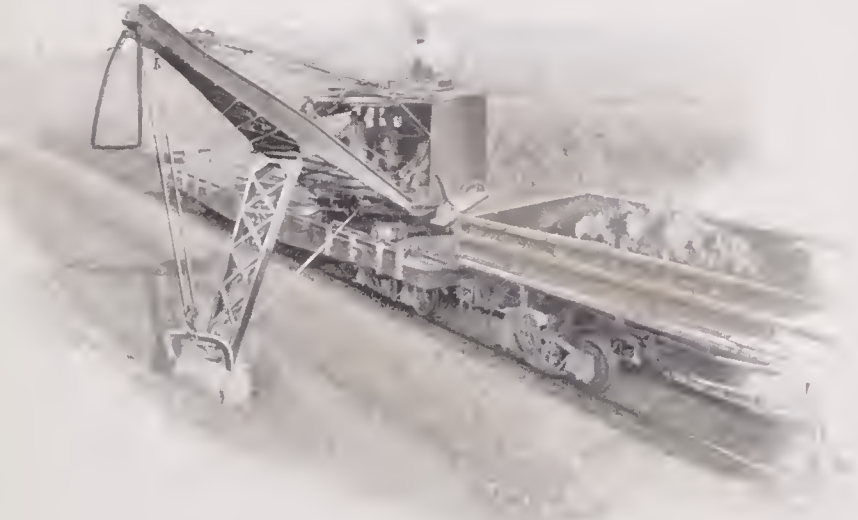
machines, saying that he prefers to stick by the old-timer which he has piloted for so many years.

Of course, many improvements and refinements have been put on later model American Ditchers that were not thought of when this old veteran went out “on line” for the first time. If you will look closely at the pictures of this old machine you will notice the odd looking plunger. When this American was

built the plunger feature had not been developed, but as soon as we began putting them on later models to poke mud and gumbo out of the dipper, the “Katy” people saw the great value of this feature and made a plunger for their old American.

It is seldom that the first machine of an entirely new type performs so well and so long in actual service as this old American Railroad Ditcher has done, and its performance is the best possible proof of the correct design and high-grade material that have characterized the American Railroad Ditcher from the very first.

Like all the American Railroad Ditchers, this old machine has been used extensively for auxiliary work, such as handling rails and other track material, bridge timbers, piling, etc. Mr. C. M. Hoes, the veteran operator



of the machine, assures us that he has picked up as many as 642 rails in 7 hours, taking the rails from where they lay scattered along the line.

Let us see how this veteran ditcher has justified its cost in the 14 years since it was installed. Take the monthly yardage shown on the preceding page, 6120 yards, a very conservative figure, and say that the ditching service covers 7 months of the year, which, again, is very moderate. That will give us a total yearly yardage of 42,840. Multiply this by 14 and we get a grand total of 599,760 yards. To be conservative, we'll say that the saving per yard is only 15 cents. That will give us a total saving of \$89,964.00 in the 14

years of service. As this machine sold for \$6000.00, it is apparent that it has saved its cost nearly fifteen times over at ditching alone; more than once a year. If the rail handling and other uses for which this machine is used outside the ditching season were figured in, doubtless it would be shown that this old American has saved its cost nearly twice every year since it was bought.

At the top of page 9 we show a reproduction of this old American's work sheet for September, 1917, when the machine had been out "on line" 12 years. We are not showing this month's record because it is in any way unusual or spectacular; because it isn't. The

Form 3296  
Daily Report of Ditcher  
Working between M. P. 57 and M. P. 610  
Character of Work: Picking up rail  
Kind of Material: 5-6 M  
No. of cars loaded: 10  
Total amount loaded: 10  
Total amount unloaded: 10  
Weather Conditions: 10  
COST OF WORK: 10  
Other Information: 10  
Signed: C. M. Hous

Form 3296  
Daily Report of Ditcher  
Working between M. P. 57 and M. P. 616  
Character of Work: Picking up rail  
Kind of Material: 5-6 M  
No. of cars loaded: 10  
Total amount loaded: 10  
Total amount unloaded: 10  
Weather Conditions: 10  
COST OF WORK: 10  
Other Information: 10  
Signed: C. M. Hous

Form 3296  
Daily Report of Ditcher  
Working between M. P. 57 and M. P. 616  
Character of Work: Picking up rail  
Kind of Material: 5-6 M  
No. of cars loaded: 10  
Total amount loaded: 10  
Total amount unloaded: 10  
Weather Conditions: 10  
COST OF WORK: 10  
Other Information: 10  
Signed: C. M. Hous

## FOURTEEN YEARS ON LINE

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American didn't do anything remarkable all month—except keep everlastingly at it; and in spite of one day lost moving, and another stolen from the ditching work, to do some work on a passing track, a total of 6120 yards of material was taken out of the ditches and the cost per yard held down to 30 cents. There were only 21 days of actual ditching.

In looking over this table it is important to remember that the latest model American has a sixteenth of a yard larger dipper, and its generally improved design makes possible the attainment of a much higher daily yardage. On page 10 we show a few very recent daily reports of this old American, which prove that it is still keeping up the pace.

### OTHER OLD-TIMERS

It was not long before the fame of the new machine that took the place of big gangs of hand laborers, and cut the cost of ditching over one-half, was spread abroad, and other roads became owners of American Railroad Ditchers.

The following roads profited by the example of the “Katy” and became American Ditcher owners in the order named:

Illinois Central Railroad  
Chicago, Rock Island & Pacific Railroad  
Great Northern Railway  
Chicago & Northwestern Railway



St. Louis & San Francisco Railroad  
Union Pacific System  
Atchison, Topeka & Santa Fe Railroad  
Northern Pacific Railway  
Southern Pacific Railway  
Canadian Pacific Railway  
Chesapeake & Ohio Railway  
Pennsylvania Railroad



## LATER AMERICANS MORE THAN FULFILL PROMISE

These later Americans more than fulfilled the promise which discerning railway maintenance men had read in the successful performance of the first American. Not one failed to prove its ability to dig ditches for a much lower cost per yard than the hand crew—more than that, every



one of them did many things that *no* hand crew could do. They dug ditches in muck and gumbo that had defied the most willing hand crews; they cleared up slides before a regular

steam shovel could have been prepared for shipment; they coaled locomotives when the coaling station burned or was blown down; they did emergency steam-shovel and pile-driver jobs; and in many other ways helped to keep trains running. In fact, the American proved that it could do so many useful things besides dig ditches that many railroad men claim that to call it a Railroad Ditcher is misleading and only tells half the story. So many roads kept buying additional Americans and so many new roads began to see the light that the American family grew with phenomenal rapidity. On the succeeding pages we print a list of some of the biggest users of Americans with the number of machines which they have.



## FOURTEEN YEARS ON LINE

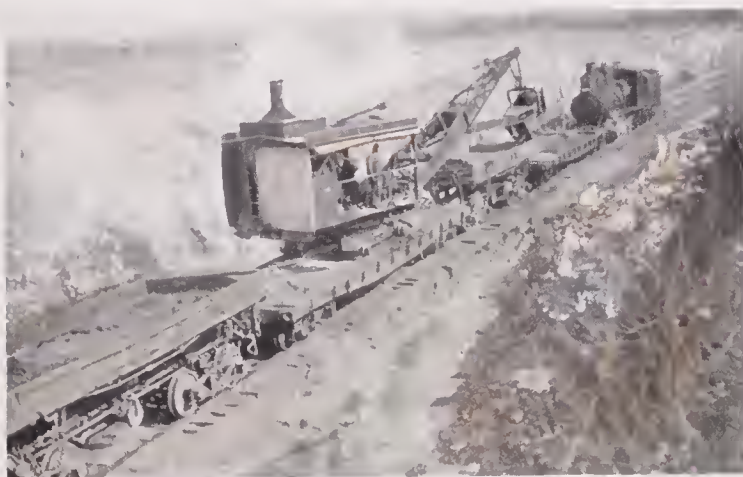
### THIRTY-TWO RAILROADS HAVE THREE OR MORE AMERICANS



The family album is now in its third edition, and before the ink on the following list is dry some of these figures will have increased.

|  |    |
|--|----|
| The Pennsylvania System . . . . .                | 20 |
| The Harriman Lines . . . . .                     | 19 |
| The Southern Railway System . . . . .            | 19 |
| Northern Pacific Railway . . . . .               | 15 |
| Santa Fe System . . . . .                        | 15 |
| Baltimore & Ohio Railroad . . . . .              | 13 |
| Chicago, Milwaukee & St. Paul Railroad . . . . . | 13 |
| New York Central System . . . . .                | 11 |
| Louisville & Nashville Railway . . . . .         | 10 |
| Union Pacific System . . . . .                   | 8  |
| Chicago & Northwestern Railway . . . . .         | 7  |
| Canadian Government Railways . . . . .           | 7  |

|   |   |
|---|---|
| Canadian Pacific Railway . . . . .                  | 6 |
| Chicago, Rock Island & Pacific Railroad . . . . .   | 8 |
| Denver & Rio Grande Railroad . . . . .              | 8 |
| Missouri, Pacific System . . . . .                  | 6 |
| Grand Trunk Pacific Railway . . . . .               | 5 |
| Chesapeake & Ohio Railway . . . . .                 | 5 |
| Seaboard Air Line Railway . . . . .                 | 5 |
| Canadian Northern Railway . . . . .                 | 4 |
| New York, New Haven & Hartford<br>Railway . . . . . | 4 |
| Norfolk & Western Railway . . . . .                 | 4 |
| St. Louis & San Francisco Railway . . . . .         | 4 |
| Atlantic Coast Line . . . . .                       | 4 |
| Missouri, Kansas & Texas Railway . . . . .          | 4 |
| Cuba Railroad (Island of Cuba) . . . . .            | 4 |
| Great Northern Railway . . . . .                    | 3 |
| Anaconda Copper Mining Co. . . . .                  | 3 |
| Kansas City, Mexico & Orient Railway . . . . .      | 3 |
| Soo Line . . . . .                                  | 3 |
| Chicago & Eastern Illinois . . . . .                | 3 |
| Western Pacific Railway . . . . .                   | 3 |

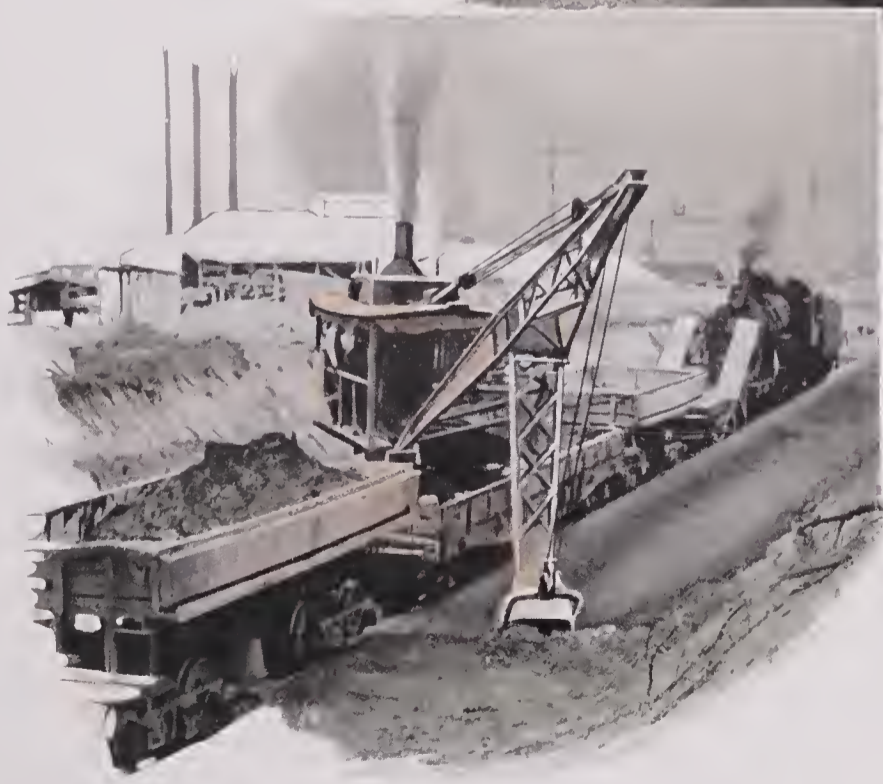
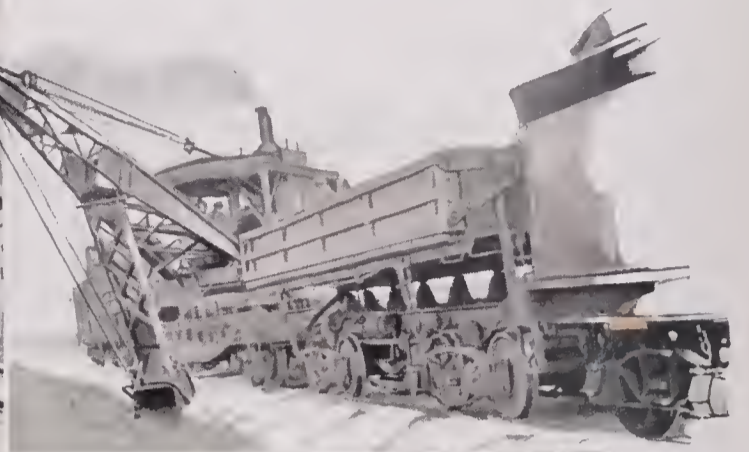
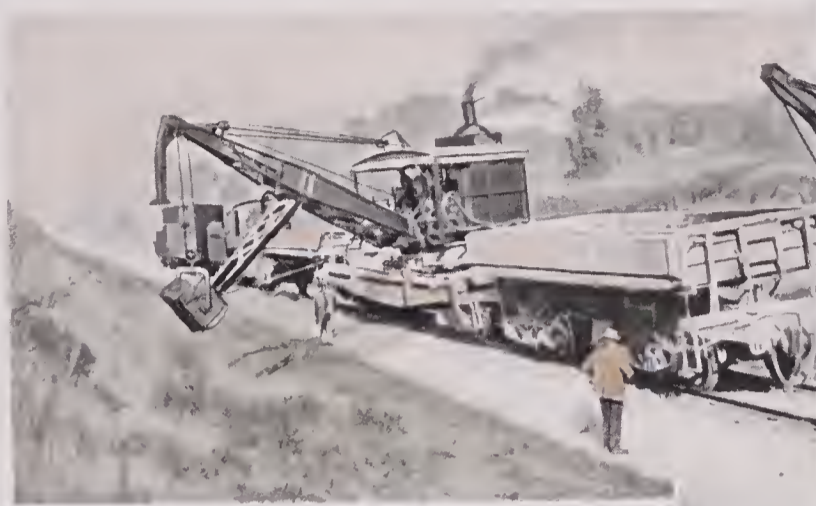


*The* AMERICAN RAILROAD DITCHER

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TWENTY-SEVEN OTHER ROADS HAVE TWO OR  
MORE AMERICANS

THERE ARE OVER 500 IN DAILY USE



## FOURTEEN YEARS ON LINE

### CUBA, MEXICO, SOUTH AMERICA, PHILIPPINES



There are twelve Americans on various large and small roads in the Island of Cuba, one on the Guayaquil & Quito Railroad in South America, one in the Philippines; and there were a number in Mexico before that country went into the revolution business, though what condition these are now in is hard to say. Even as sturdy a machine as the American is not proof against a machine gun manned by a peon full of aguardiente.

But the significant thing about the use of the American Railroad

Ditcher in these countries, where the wage paid to labor is so ridiculously low as to make it seem impossible that a machine could do the work any cheaper, is that they continue to use them. The fact that there are twelve Americans on the Island of Cuba proves that it pays. It pays because it is dependable. It celebrates no fiestas and has no tendency to take a siesta at mid-day. It works steadily, dependably and resultfully; and that's something that no labor gang will do—in Cuba or anywhere else.



*The* AMERICAN RAILROAD DITCHER

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Above—The oldest American as it left our shops, May, 1905  
Below—1920 model American

## RIGHT-OF-WAY DITCHING

This is what the American Railroad Ditcher was built for, and is perhaps the thing it does most resultfully. (Though you will find any number of maintenance men who will contest this statement in favor of any one of its twenty-odd auxiliary uses.) It takes the place of big, cumbersome, costly crews of hand shovelers, and not only halves the cost per yard, but digs more lineal feet of ditch in a season.

Ditches we must have, for there is no question about the fact that dry ballast and roadbed are essential to safe track. To secure this, water that falls on the roadbed or is directed to it must be quickly drained off. If it is allowed to stay in the subgrade, "soft track" with its attendant troubles will result. Adequate drainage usually can be secured by digging a ditch along the track deep enough to extend well below the ballast.

The provision of the ditch is the main thing; next in importance is the need to dig the ditches as cheaply as possible. Until the American Railroad Ditcher entered the field it was almost impossible to complete a ditching program in season, even by absolutely forgetting costs. And, as a general thing, where hand crews were employed the cost per yard was a very painful thing to the men in charge of maintenance of way; something they did not care to dwell on.

It is a well-known fact, that the average laborer, under the most

favorable conditions, armed with a No. 2 shovel, and a No. 1 boss to keep him from stagnating, will pitch three-quarters of a yard an hour from ditch to car, or  $7\frac{1}{2}$  yards in 10 hours. At \$1.50 a day (those old time prices, don't they sound good?) this meant that every yard pitched out of the ditch cost 20 cents. Under present labor prices it perhaps costs you more than twice as much. But, wait a minute, we were figuring on 10 hours straight work. This, of course, is an ideal condition which is seldom or never realized out "on line." The necessity of clearing for trains may cut the actual working time from 10 hours to  $3\frac{1}{3}$ . That would cut each laborer's yardage down to  $2\frac{1}{2}$  a day, and, figuring the cost on the basis of the good old dollar and a half of the days that are no more, each yard shoveled up onto the flat car would cost you 60 cents. At present prices it would cost—but why rub it in? All this time we have been assuming that those hand shovelers were working in sand or ordinary dry dirt, but what if you are trying to ditch a gumbo cut when it's about 90 in the shade? Or suppose there is icy water in the ditch. Conditions like that may very easily whoop the cost up from \$1.00 a yard to as high as you care to figure it. All of which goes to demonstrate the fact that hand labor *does not* produce economical right-of-way ditches.

AMERICAN DITCHER FLAT CAR WORK TRAIN AND  
EXTRA GANG DITCHING RESULTS COMPARED

Any railroad man who has charge of track maintenance will admit that a machine which, in 4 months' work, can do approximately 25 per cent more work than a hand crew will do in the same time, and net a saving of 2500 cold, hard dollars, is very much worth investigating. That's what an American Railroad Ditcher, working on a flat car work train such as is shown in the illustration below, did on the Fort Smith & Western Railroad. We have the

figures to prove it. In looking these over, please bear in mind that labor costs when this work was done were much lower than at present. The saving which the American would effect in the same sort of a competition today would be much greater in actual dollars and cents. It is important to remember that the unloading was done by hand in both cases. As the cost of the work train would be the same in either case, this has not been figured in.

THE HAND CREW—COST AND RESULTS

| Month     | Cars  | Yards | Cost      | Per Yard |
|-----------|-------|-------|-----------|----------|
| July      | . . . | 2200  | \$794.00  | \$0.36   |
| August    | 524   | 3668  | 1378.00   | 0.37     |
| September | 372   | 2640  | 880.00    | 0.34     |
| October   | 300   | 2100  | 764.00    | 0.36     |
| November  | 280   | 3490  | 1256.00   | 0.36     |
|           |       | 14098 | \$5072.00 |          |

THE AMERICAN—COSTS AND RESULTS

| Month    | Cars | Yards | Cost     | Labor    | Total     | Per Yard |
|----------|------|-------|----------|----------|-----------|----------|
| December | 324  | 3888  | \$158.00 | \$261.00 | \$419.00  | \$0.11   |
| January  | 289  | 3468  | 258.00   | 157.00   | 415.00    | 0.12     |
| February | 329  | 3948  | 234.00   | 148.00   | 382.00    | 0.10     |
| March    | 247  | 2964  | 223.00   | 150.00   | 373.00    | 0.12     |
|          |      | 14268 |          |          | \$1589.00 |          |

In 4 months with the American, as compared with 4 months all-hand work, approximately 25 per cent more work done at over \$2500.00 saving.

|   |         |
|---|---------|
| Ditching and unloading by hand, per yard                          | \$ .36  |
| Ditching with the American, unloading by hand, per yard . . . . . | .111    |
| American's saving, per yard .                                     | \$ .249 |



## FOURTEEN YEARS ON LINE

### OTHER AMERICAN FLAT CAR WORK TRAIN SAVINGS

#### CHESAPEAKE & OHIO RAILWAY

It used to cost these people a dollar or more for every yard that came out of their ditches, much of the material being boulders and stiff gumbo. Their American Railroad Ditchers did the same work for 40 cents a yard.

#### C. R. I. & P. RAILWAY

This road replaced a ditching gang of 67 hand shovelers that had been getting out 144 yards a day at a cost of 66½ cents a yard, with an American Railroad Ditcher. Result was they whooped up the daily yardage to 264 yards, walloped the cost per yard down to 4 cents and saved \$84.20 a day. This does not include cost of work train.

#### MISSOURI, KANSAS & TEXAS RAILWAY

It was costing them 37 cents a yard to dig right-of-way ditches by hand. One of their American Railroad Ditchers was detailed to do the job and immediately the cost per yard fell to 19 cents.

#### THE FORT SMITH & WESTERN RAILROAD

used a gang of 33 men at special cut ditching work. They used to dig an average of 185 cubic yards a day at a daily cost, including work train, of \$52.70, putting 7 yards on each flat car.

The labor gang was then displaced by an American Railroad Ditcher, which loaded 220 yards a day. The daily cost, including work train, was \$29.52. The American put 11 yards on each flat car.

|                               |                |
|-------------------------------|----------------|
| Cost per day of hand ditching | \$52.70        |
| Cost per day with American    | 29.52          |
| Daily saving of American      | <u>\$23.18</u> |



## THE AMERICAN DUMP CAR WORK TRAIN

Fourteen years ago, when the first American was put out, ditching on a large scale was done with big extra gangs which loaded the material onto flat cars. The American merely displaced the gang, at first, the flat car train being retained. The American traveled the length of the train on its own portable track sections, loading the cars with material dug from the ditches as it progressed.

This was such a revolutionary advance over the hand-crew method and chalked up such a worth-while saving per cubic yard, that at first all the delighted maintenance of way men could do was pinch themselves to see if they really were awake, and that the doing away with the big ditching gangs was not just a pleasant dream after all.

But having become used to the savings in time, money and worry effected by the American, progressive maintenance men began to wonder if some improvement couldn't be made in the arrangement of the ditching train; something that would

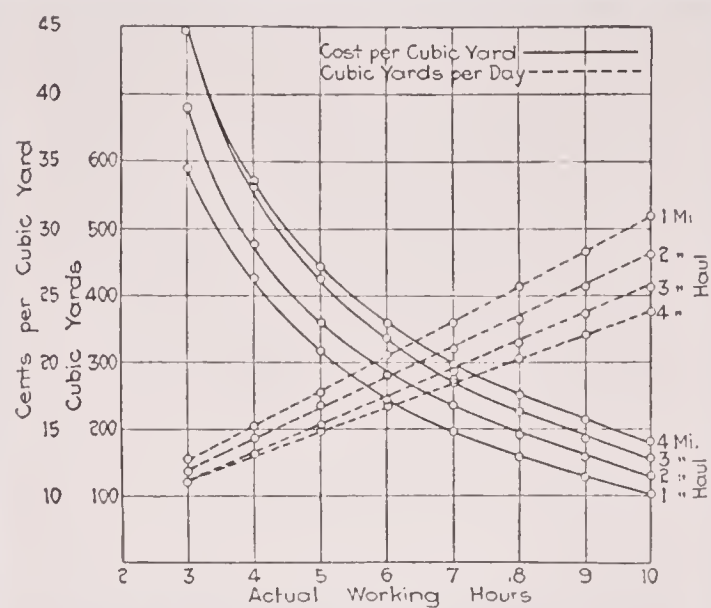
do away with the necessity of stringing the cable of the unloader plow, etc. And so the American Dump Car Work Train came into being. The American Dump Car Work Train consists of an American Railroad Ditcher, mounted on a flat car between two 16 or 20-yard dump cars and propelled by a light locomotive.

This dump car ditching train can be unloaded at almost any point for filling bridges, widening banks, or wasting the spoil. It can be used most effectively where the length of haul from the cut to the dumping point does not exceed 4 miles. As the train can be handled rapidly and requires only a short length of sidetrack to hold it, it can easily be kept out of the way of regular trains, thus causing no interference with traffic and, at the same time, keeping time lost clearing for trains down to the lowest possible figure.

On one road, with an average haul of 1 to 4 miles, the train makes 10 to 20 trips per day. In that time it handles more material than a work train of 15 flat cars (10 cubic yards per car) with ditcher and unloader plow.



ESTIMATING DAILY YARDAGE AND COST PER YARD



With the diagram shown on this page it is possible to estimate with accuracy the amount and cost of the work that can be done in this way with a train having one ditcher and two 20-yard dump cars. The diagram is for ditches from 2 to 3 feet deep. The excavating capacity is 60 yards an hour, the train speed

20 miles an hour, and the distance to switch or dump 2 miles. The daily cost of the work train, wages, fuel, oil, interest and depreciation, is taken at \$53.76.

When digging a ditch 2 feet deep and actually working 6 hours a day, the daily yardage will be 280 cubic yards, and the cost per yard, 20 cents.

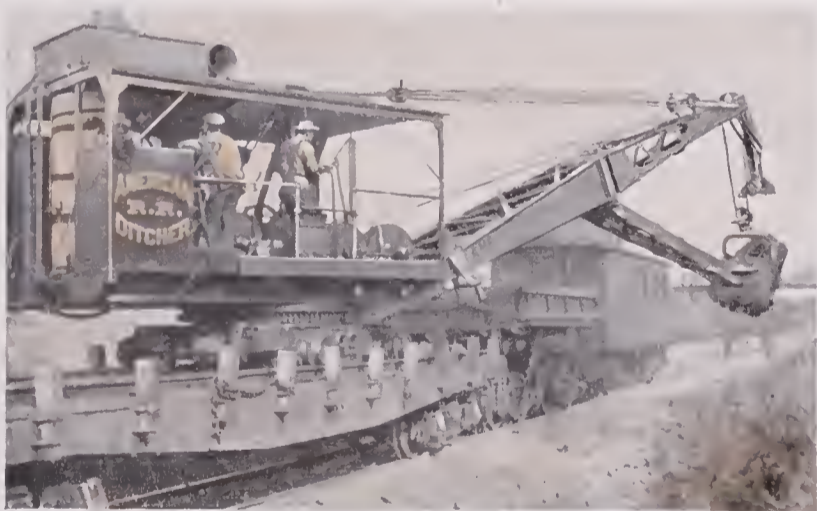


DITCHING TOUGH CLAY FOR FROM 8 TO 11  
CENTS A YARD

The Georgia & Florida Railway, used one of its American Railroad Ditchers to ditch a number of cuts in tough “calico” clay. The American was mounted on a flat car between two 20-yard dumps. Besides the ditcher operator, fireman and 2 laborers, there was a train crew made up of an engineer, a conductor and a flagman.

|                                    |         |
|------------------------------------|---------|
| The wages of all the men totalled, |         |
| per day . . . . .                  | \$25.00 |
| Locomotive, per day . . . .        | 5.00    |
| 1 ½ tons coal for ditcher . .      | 4.50    |
| Three cords wood for locomotive    | 5.10    |
| Ditcher . . . . .                  | 5.00    |
| Dump cars . . . . .                | 5.00    |
| Camp cars . . . . .                | 1.00    |
| Flat car . . . . .                 | .75     |
| Total cost per day . . . .         | \$51.35 |

Working 10 hours a day this train ditched the clay cuts and deposited the material on fills for a cost ranging from 8 to 11 cents.



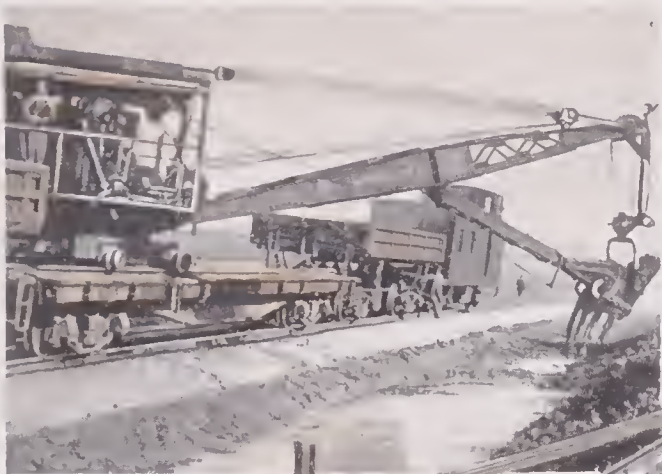
## HANDLING GUMBO FOR 11 CENTS A YARD

Half a mile east of Beloit, Alabama, on the Myrtlewood Division, the Louisville & Nashville Railroad ditched a gumbo cut where the material was so sticky that it would not slide out of the dump cars. It had to be shovelled out. Every dipperful had to be poked out with the plunger, and were it not for this patented and exclusive feature, it would have been necessary to loosen the material with hand shovels.

On this job the American was used between two 16-yard dump

cars. Thirty-two of these cars were loaded in a day and hauled 1  $\frac{1}{4}$  miles to dump. The total daily yardage was 512 yards and the cost of the ditching train was \$52.50, making the cost per yard less than 11 cents.

As stated, the material which was dug out of the cut was so sticky that it would not slide out of the dump cars, which were floored with wood. It had to be dug out by laborers. This fact makes the cost of less than 11 cents a yard still more remarkable. Another feature of this job which adds interest to the 11 cents a yard figure is that at first they were using hand dump cars, which had to be righted by hand after they were dumped. Sometimes it took 10 or 12 men to do this.



AVERAGING 623 YARDS A DAY FOR 30 DAYS WITH  
A DUMP CAR WORK TRAIN

During November, 1917, the Southern Railway's American Railroad Ditcher, No. D.M. 17, worked



on what is known as the Coster Division. During the month under consideration it actually worked 25 days, in which a daily average of 623 yards of material was taken out of the ditches, dumped on fills, and leveled off. The American was used between two dump cars, which

were dumped by hand, there being a laborer on each car for that purpose. On November 1st, the American commenced work at 6 A. M. and stopped at 4:30 P. M. Train service held up the work for 2 hours, and another hour was consumed taking on coal and water, leaving 7½ hours actual working time. In this time 704 yards of material were taken out of the ditches, dumped on a fill and leveled off with the spreader. On this day a ton of coal, 1200 gallons of water, a quart of oil and a pound of waste were used in the operation of the ditcher.

The actual cost of the ditching crew per day was as follows:

|                                   |          |
|-----------------------------------|----------|
| Operator . . . . .                | \$3.33 ½ |
| Fireman . . . . .                 | 2.16 ½   |
| Two laborers at each \$1.55 . . . | 3.10     |
| Total . . . . .                   | \$8.60   |



FOURTEEN YEARS ON LINE

WHAT THE AMERICAN DID DAY BY DAY

| Date    | Hours on Line | Delays | Time Worked         | Number of Cars Loaded | Daily Yardage |
|---------|---------------|--------|---------------------|-----------------------|---------------|
| Nov. 1  | 10½           | 3      | 7½                  | 44                    | 704           |
| Nov. 2  | 10½           | 3½     | 7                   | 48                    | 768           |
| Nov. 3  | 6             |        | Cleaning out boiler |                       |               |
| Nov. 5  | 10            | 3½     | 6½                  | 36                    | 576           |
| Nov. 6  | 10            | 3      | 7                   | 42                    | 672           |
| Nov. 7  | 10            | 3½     | 6½                  | 53                    | 848           |
| Nov. 8  | 10            | 3½     | 6½                  | 48                    | 768           |
| Nov. 9  | 10            | 3      | 7                   | 42                    | 672           |
| Nov. 10 | 7             | .      | 7                   | 28                    | 448           |
| Nov. 12 | 10            | 5      | 5                   | 24                    | 384           |
| Nov. 13 | 10            | 3½     | 6½                  | 48                    | 768           |
| Nov. 14 | 10            | 3½     | 6½                  | 42                    | 672           |
| Nov. 15 | 10            | 3½     | 6½                  | 43                    | 688           |
| Nov. 16 | 10            | 1½     | 8½                  | 54                    | 864           |
| Nov. 17 | 7½            | 1      | 6½                  | 28                    | 448           |
| Nov. 19 | 10            | 4½     | 5½                  | 28                    | 448           |
| Nov. 20 | 10            | 5      | 5                   | 32                    | 512           |
| Nov. 21 | 10            | 3½     | 6½                  | 44                    | 704           |
| Nov. 22 | 10            | 3      | 7                   | 44                    | 704           |
| Nov. 23 | 10            | 3      | 7                   | 42                    | 672           |
| Nov. 24 | 7             | 2      | 5                   | 24                    | 384           |
| Nov. 26 | 10            | 4½     | 5½                  | 28                    | 448           |
| Nov. 27 | 10            | 4½     | 5½                  | 36                    | 576           |
| Nov. 28 | 10            | 3½     | 6½                  | 40                    | 640           |
| Nov. 29 | 10            | 4      | 6                   | 42                    | 672           |
| Nov. 30 | 10            | 4½     | 5½                  | 30                    | 480           |

|   |         |
|---|---------|
| Total hours worked . . . . .                        | 159½    |
| Total number of cars loaded . . . . .               | 970     |
| Total yardage . . . . .                             | 15,520  |
| Average daily yardage . . . . .                     | 623     |
| Estimated cost of dump car train, per day . . . . . | \$30.00 |
| Daily cost, ditcher and train . . . . .             | \$38.60 |
| Cost per yard . . . . .                             | \$.0619 |



## THE DOUBLE DITCHER DUMP CAR WORK TRAIN

The Double Ditcher Dump Car Work Train is an outgrowth of the single ditcher train. It was developed by several roads to do intensive ditching on heavily traveled lines where the working time between trains is very limited. With the Double Ditcher Dump Car Work Train it is possible to fill four dump cars in the same time required by one ditcher to fill two. That

means twice as much ditching without a proportionate increase in cost, because only one locomotive and train crew are needed.

The Southern Railway has operated double dump car ditching trains with great success, as have also the Rock Island, the Illinois Central, the Kansas City Southern Railway, the A. T. & S. F., and others.

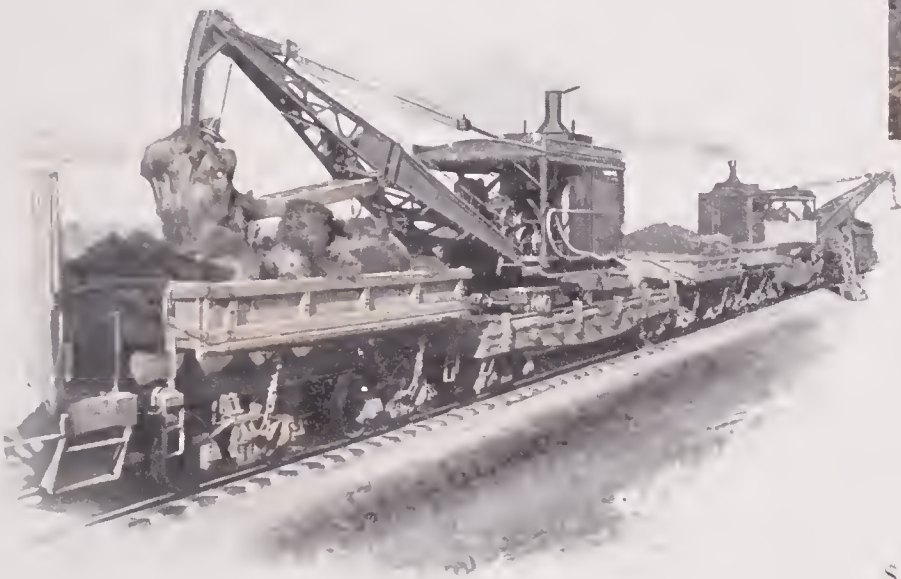


The Kansas City Southern found that they were able to put 15 yards into each of the four dump cars in 25 minutes, making an average of 40 to 45 minutes for each train handled.



COMPARISON OF COST AND RESULTS OF SINGLE AND DOUBLE DITCHER WORK TRAINS

The figures below are based on prices prevailing before the war. By using them as a working basis the cost under existing conditions can easily be determined.



COST OF SINGLE DITCHER WORK TRAIN

|                                 |             |
|---------------------------------|-------------|
| Two automatic air dump cars     | \$3,500.00  |
| Freight (estimated) on above    | 250.00      |
| One 80,000-pound flat . . . . . | 800.00      |
| Ditcher . . . . .               | 6,000.00    |
| Freight (estimated) on above    | 250.00      |
| Total . . . . .                 | \$10,800.00 |

\$10,800.00 times 2 = \$21,600.00, cost of Double Ditcher Work Train

COST PER CUBIC YARD SINGLE DITCHER WORK TRAIN

|   |         |
|---|---------|
| Interest per day on train at 6 per cent, 312 days . . . . . | \$2.07  |
| Depreciation on ditcher at 8 per cent . . . . .             | 1.54    |
| Depreciation on dump car train at 8 per cent . . . . .      | .85     |
| Coal, one ton at \$2.50 for ditcher                         | 2.50    |
| Oil, waste, etc., for ditcher . . . . .                     | .50     |
| Coal, two tons at \$2.50 for locomotive . . . . .           | 5.00    |
| Ditcher engineer at \$125.00 per month . . . . .            | 4.80    |
| Oil, waste, etc., on locomotive . . . . .                   | 1.00    |
| Ditcher fireman at \$1.50 . . . . .                         | 1.50    |
| Train conductor . . . . .                                   | 5.00    |
| Two brakemen at \$2.50 . . . . .                            | 5.00    |
| Locomotive engineer . . . . .                               | 5.00    |
| Locomotive fireman . . . . .                                | 1.50    |
| Total . . . . .   | \$36.26 |

DOUBLE DITCHER WORK TRAIN

|   |         |
|---|---------|
| Interest per day on train at 6 per cent, 312 days . . . . . | \$4.14  |
| On two ditchers . . . . .                                   | 3.08    |
| On four dump cars and two flats . . . . .                   | 1.70    |
| Coal for two ditchers . . . . .                             | 5.00    |
| Oil, waste, etc., two ditchers . . . . .                    | 1.00    |
| Coal for locomotive . . . . .                               | 5.00    |
| Two ditcher engineers . . . . .                             | 9.60    |
| Oil, waste, etc., on locomotive . . . . .                   | 1.00    |
| Two ditcher firemen . . . . .                               | 3.00    |
| Train conductor . . . . .                                   | 5.00    |
| Two brakemen at \$2.50 . . . . .                            | 5.00    |
| Locomotive engineer . . . . .                               | 5.00    |
| Locomotive fireman . . . . .                                | 1.50    |
| Total . . . . .   | \$50.02 |

\$36.26 ÷ 200 yards per day = \$0.1813, cost per cubic yard with Single Ditcher Work Train.

\$50.02 ÷ 400 yards per day = \$0.12505, cost per cubic yard with Double Ditcher Work Train.

\$0.1813 - \$0.12505 = \$0.05625.

Thus it will be seen that the Double Ditcher Work Train will do right-of-way ditching at a saving of \$0.05625 per cubic yard, over the Single Ditcher Work Train.

TRIPLE DITCHER WORK TRAIN

A Triple Ditcher Work Train; three American Railroad Ditchers and six dump cars, has been used by the Queen & Crescent (Southern Railway), Big Four, and others, to test out the ability of this arrangement to ditch heavily traveled lines. The experiments showed some wonderfully fast ditching work, and a further cut in the cost from the figures obtained in double ditcher ditching train work.

The following figures were worked out with the cost of a single ditcher train as a basis:

|   |         |
|---|---------|
| Interest per day on train at 6 per cent, 312 days to year . . . | \$6.21  |
| Interest per day on two ditchers . . .                          | 4.62    |
| Interest per day on six dump cars and three flats . . . . .     | 2.55    |
| Coal for three ditchers, 3 tons . . .                           | 7.50    |
| Oil, waste, etc., for ditchers . . .                            | 1.50    |
| Coal for locomotive . . . . .                                   | 5.00    |
| Three ditcher operators . . . . .                               | 14.40   |
| Oil, waste, etc., on locomotive . . .                           | 1.00    |
| Three ditcher firemen . . . . .                                 | 4.50    |
| Train conductor . . . . .                                       | 5.00    |
| Two brakemen at \$2.50 . . . . .                                | 5.00    |
| Locomotive engineer . . . . .                                   | 5.00    |
| Locomotive fireman . . . . .                                    | 1.50    |
| Total . . . . .   | \$63.78 |

$\$63.78 \div 600$  yards per day = \$.1063, cost per cubic yard with Triple Ditcher Dump Car Work Train.

\$.1813 cost per yard, Single Ditcher Train.

0.1063 cost per yard, Triple Ditcher Train.

$\$0.0750$  saved by Triple Ditcher Train.

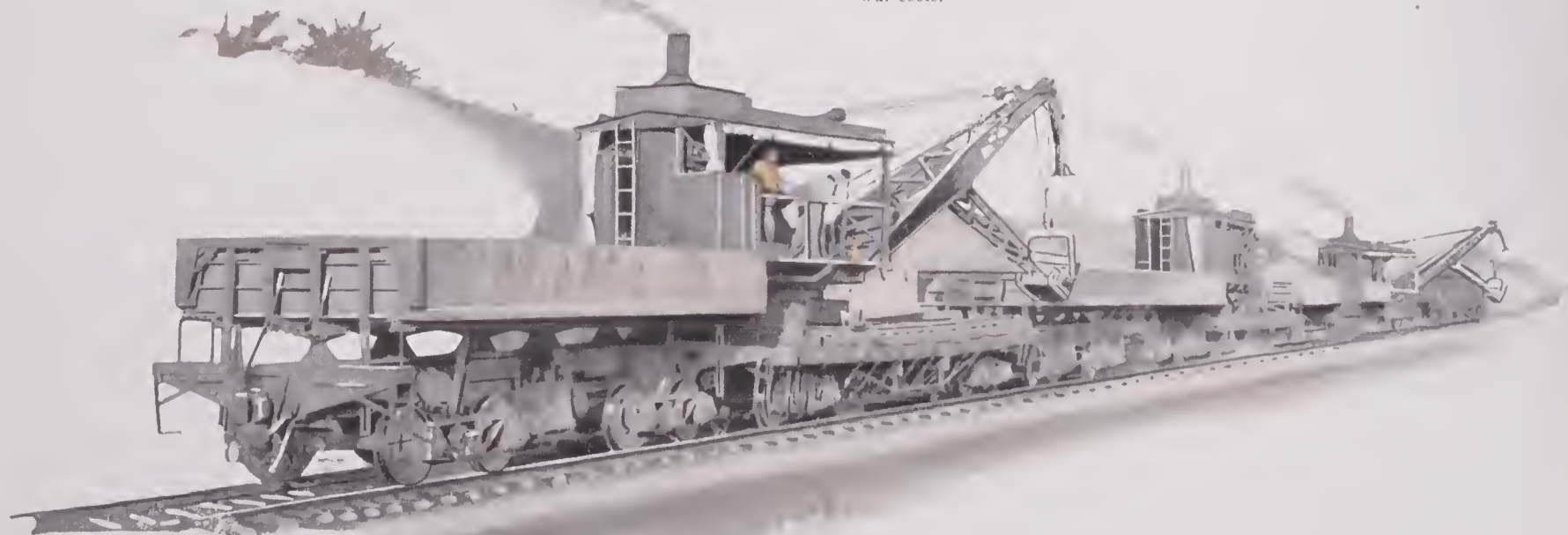
It is probable, though, that the saving of money will not interest some railroad men so much as the fact that a Triple Ditcher Dump Car Train will enable them to ditch cuts on heavily traveled lines that they have been unable to ditch properly in any other way.

The three ditchers treble the results with no increase in train cost.

The 200 yards on which the above averages are based is a very conservative estimate and allows for only 5 hours' actual work.

This rapid fire method, as we have said, is especially effective for ditching on roads that have a heavy train service, but as it simply means more ditching done in less time, for less money, it is applicable to *any* road under *any* kind of service.

It should be borne in mind that the above figures are based on pre-war costs.



ONE MAINTENANCE MAN'S CONCLUSIONS

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The General Superintendent of Maintenance of Way of a large eastern system that has over a dozen American Railroad Ditchers, made these three points in an article on "Labor Saving Devices for Track Maintenance":

*1st.* In normal railroad maintenance, labor costs amount to as much, often more, than all other items combined, averaging from 50 to 55 per cent.

*2nd.* The cost of hand crew service in ditching and other maintenance work has advanced 40 per cent during the past year, and 100 per cent in 10 years.

*3rd.* The loading capacity of the American is about 60 cubic yards an hour in ordinary material, with a ditcher crew of three men. It would require 100 men to load this amount by hand.

These are the kind of results that have led the leading roads of this country to dispense with the unsatisfactory and inefficient hand crew and install American Railroad Ditchers.

### AMERICAN ELECTRIC DITCHER

The American Electric Railway Ditcher was designed to fill the needs of electric railways. It is identically the same as the steam operated machine except that the steam boiler and engine are replaced by a motor and controller. The first machine of this type was installed on the Kansas City, Clay County and St. Joseph Railway, just in time to clean up a series of clay slides caused by a spell of exceptionally heavy rains. These slides along the St. Joseph Division were so heavy as to completely tie up the line. Referring to its work on this occasion, Mr. J. R. Harrigan, General Manager, said: "I assure

you that having this ditcher available to clean up these slides was one of the luckiest things that ever happened to me. I am very much pleased with the operation of this machine."

During its first year of service this machine handled a very large amount of material for a cost of approximately 12 cents a yard. Besides, the condition of the track was improved so much by the thorough ditching it received, that delays in train service were cut to a very low figure. This electric ditcher easily handles 350 yards in a 9-hour day, working in a regular dump car train.



## FOURTEEN YEARS ON LINE

When this road did its ditching by hand they used to manage to get out 20,000 yards a year, and every yard cost them 40 cents. With the American Electric Ditcher they are now getting out a yearly average of 50,000 yards and the total operating cost of the ditcher during the 8½ months ditching season is \$6630.00, against \$8000.00, for the hand crew.

These people now have the cost per yard down to 7 cents, a saving of 33 cents a yard over the hand method.

Following are cost figures covering an average day's work:

*Work*—Right-of-way ditching, cut widening, and bank filling.

*Material*—Clay, fairly dry and tough.

*Length of Day*—Fourteen hours.

*Time Actually Working*—Seven and one-half hours. This includes the time consumed by ditching, dumping and traveling to and from the siding.

*Crew*—Ditcher crew, operator and 2 laborers. Train crew, motorman and conductor.

### *Daily Cost*

|                                     |         |
|-------------------------------------|---------|
| Payroll (14 hours a day). . . . .   | \$18.06 |
| Power bill. . . . .                 | 5.00    |
| Oil and waste . . . . .             | .50     |
| Interest on investment (5 per cent) | 1.50    |
| Incidentals. . . . .                | 1.00    |

Daily operating expenses . \$26.06



LAYING TRACK AND DRIVING PILES WITH AN  
AMERICAN ELECTRIC DITCHER

---



The Oklahoma Railway was the second electric line to install an American Electric Ditcher. They at once set this machine to work on the new line from Edmond to Guthrie, Oklahoma, laying track, driving piles, placing caps, stringers, etc.

More than 1000 feet of trestle building was included in this. The piles driven varied from 28 to 58 feet in length and the penetration was from 7 to 13 feet in sand and shale. One 15 bent trestle was driven and completed by this electric American in 6 days.



The actual cost of building the 1000 feet of trestle which was handled by the American was \$3.12 a foot. This includes all wages and expense outside of the cost of the material itself. Officials of the Oklahoma Railway stated that the cost of doing the work with the American was 30 per cent under the best contractor's bid covering the same work.

This machine has also been used extensively for steam shovel work. It

took 10,572 yards of hard packed sand out of one cut, working down in the cut and dumping into 16-yard dump cars on the bank. Only two cars were available, so while these were being dumped the American could do nothing. Yet it got out as high as 412 yards a day under these conditions. This electric American also was used to set trolley poles. These people have since purchased another electrically operated American.

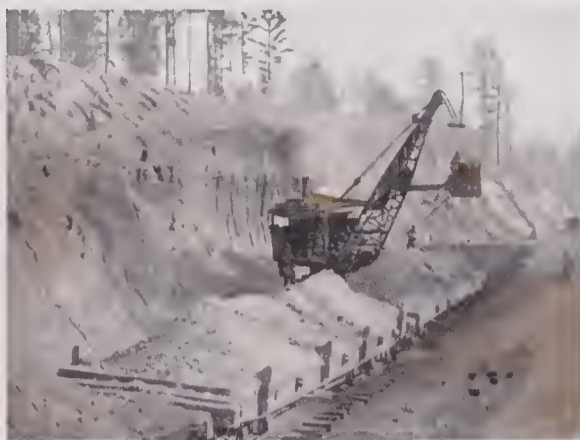
### AUXILIARY USES

While the American Railroad Ditcher, as its name implies, was originally developed to dig right-of-way ditches, we did not lose sight of the desirability of having it do as many other kinds of useful work as possible, in order that its owners might keep it busy every day, rain or shine, and secure the greatest possible return on their investment. Hardly a month goes by without our hearing of some new auxiliary use to which the ditcher has been put, until now, the list of such

work is so long that often we have wondered whether we were not doing the American a real injustice by calling it merely a railroad ditcher.

On the following pages we describe and illustrate a number of actual jobs performed by the American. In each instance we have tried to select a good typical case in order to give railroad men a true idea of how efficiently the American performs these many and varied kinds of work.

## STEAM SHOVEL WORK



To illustrate this particular angle of the American's usefulness, we are going to describe its work in some of the most difficult material a steam shovel ever was set into—disintegrated granite.



When Mr. R. J. Barry, Superintendent of the H. & T. Central Railway, wanted to get out some material for ballasting track, he called for bids based on taking the dirt out of his borrow-pit at Kingsland, Texas. The contractors came, they saw and they figured, and their figures were so high that they nearly bowled Mr. Barry over—12 cents a yard, no less! But if you look closely at the pictures we show, you won't blame them much, because the material stood up like the wall of a fort and the dipper teeth gnawed shiny channels in the stubborn stuff. Mr. Barry thanked the contractors kindly for figuring, but made a mental vow, that if they got 12 cents a yard out of the H. & T.

Central, they'd get it over his dead body. While he was doping out ways and means he happened to think of his road's American Railroad Ditcher, and decided to give it a tryout in his borrow-pit.

As stated, the material handled is a disintegrated granite, very hard, and containing occasional ledges of solid granite. At first the material was handled without blasting, except when it became necessary to get a ledge of solid granite out of the way, but later on it was found advisable to "shoot" the material before attempting to load it.

The cars usually set in to be loaded are of the hopper bottom type, 100,000 pounds capacity. They hold from 35 to 45 cubic yards of gravel. When enough cars were available, the American loaded as many as twelve a day.

The American operated over its two portable sections laid on the ground, while the cars to be loaded were set in beside it on the permanent track. No locomotive was kept in attendance to spot cars. Instead, a string of empties was set in every

morning and the American did its own spotting by means of the pull-back line. This feature alone is a great advantage over an ordinary steam shovel.

This pit is about a quarter of a mile long and the average height of the face is 20 feet.

The American loads material out of this pit for .046 cents a yard, which indicates a very gratifying saving over the 12 cents a yard, which was the best contract price submitted.

While Mr. Barry's experiences with the American as a steam shovel was most gratifying. Many other ditcher owners have done at least equally well. Invariably they have expressed surprise that a machine with so small a shovel could make such an excellent yardage record in comparison with the work done by large steam shovels. Of course, the explanation lies in the much greater speed and mobility of the American. It

makes more passes per minute than the large shovel, and can move forward and commence digging again in but a fraction of the time that a regulation steam shovel requires for the same operation.

Another important advantage which the American has over the regular steam shovel is the fact that it gets along with a much smaller crew of men. Following is the usual crew line-up used with the ditcher when doing steam shovel work:

- One operator
- One fireman
- One laborer
- One man and team (to haul coal and water)

When material is being loaded into wagons and it is not convenient to bring the wagons alongside the machine, the full circle swing of the American allows wagons to be loaded directly behind the ditcher, or at any point in the 60-foot radius of the machine.



## GRADING FOR STREET RAILWAY TRACKS

Grading for track is one of the many things the American does well. It will grade a city street for track as well as a steam shovel that can do nothing else. Then it will go back

and lay the track; something that the regulation steam shovel cannot do.

In 1917 the Chicago, North Shore & Milwaukee Railroad Company extended their tracks about a mile through the streets of Waukegan, Illinois, doing the work with

their American Railroad Ditcher. The specifications called for a cut only 9 feet wide and from 18 inches to 2 feet 8 inches deep. This was for a single track line.

The American worked over its own portable track sections, which it transferred as it progressed. The material was loaded into dump carts, seven teams being kept busy all the time, and more would have been required, only the haul was very short.

The work was done over very old streets, partly macadamized, and the digging was very hard. In spite of this, the American took out a daily average of 200 yards. The total amount of material excavated was in the neighborhood of 5000 yards.

No hand work was put on the grade after the American had passed, the concrete being run onto it just as the American had left it.

When the grading job was completed and the men in charge checked up their costs they found that they had saved about 25 cents a cubic yard over the best bid received from a contractor.

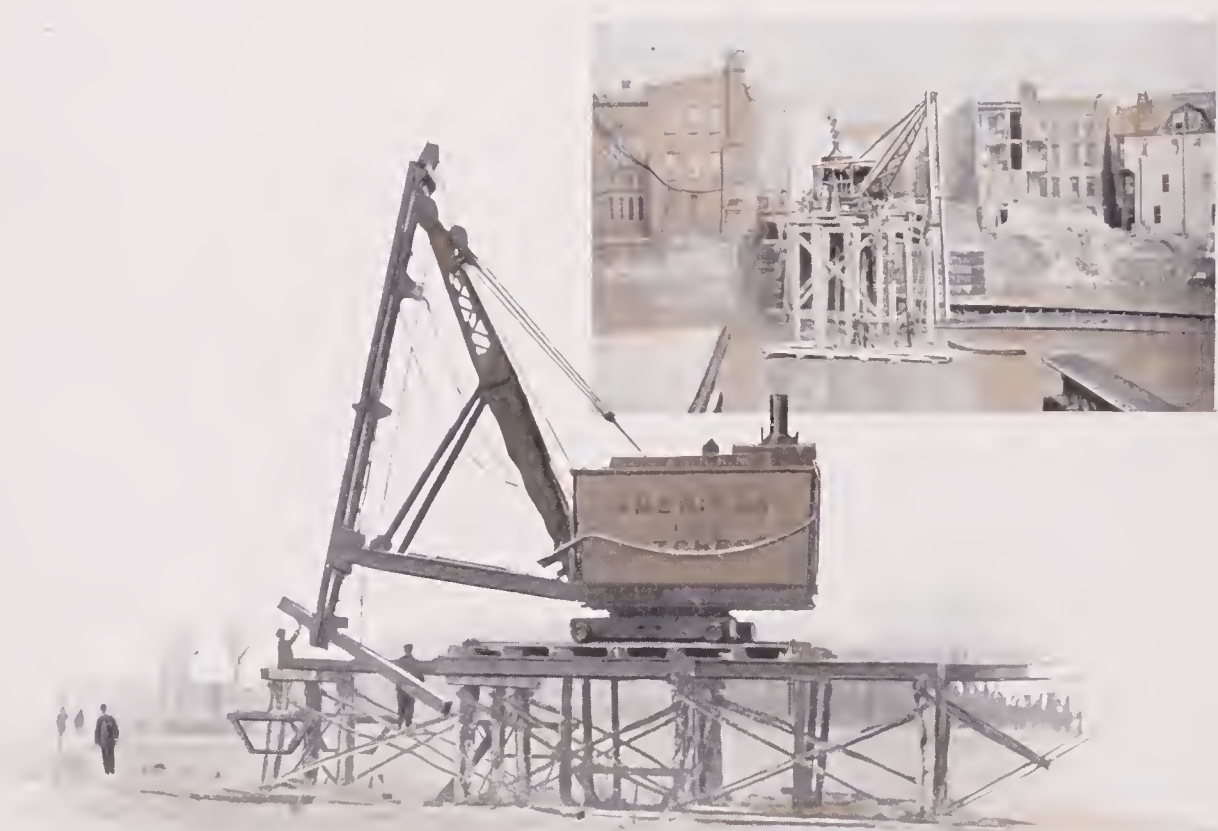


### PILE DRIVING

So many roads have used American Railroad Ditchers for driving piles that we could devote a large and very instructive book to this angle of the American's usefulness, but as it is necessary to limit ourselves to one instance of the American's efficiency at this work, we will tell you how the Boyne City, Gaylord & Alpena built a 340-foot temporary trestle with their American.

This trestle was intended for filling in and was built of 3-pile bents, the two outside piles being driven at a batter, and 8x8 caps used. The trestle was from 10 to 16 feet high and the piles used ranged in length from 16 to 24 feet. The ditcher worked on the grade line on 12-foot portable track sections, traveling over the trestle on temporary stringers as the pile

bents were driven and capped. In this way from eight to nine 12-foot bents were driven in a day, a daily average of 100 feet of completed trestle. An especially interesting fact about this job is that the piles used were all "dead heads" and "sinkers" which the American fished out of the river. During the construction of this trestle 70-pound steel rails were used for temporary stringers, underneath regular ties, and 70-pound steel to pass the dirt cars over when filling the trestle. The steel stringers were pulled out and the track laid and lined up when the fill reached sub-grade. This saved the road the cost of permanent stringers. The cost of caps, nails and labor was \$3.75 per bent.



COAL HANDLING—LOADING FROM STORAGE PILE

Practically every road that owns American Railroad Ditchers sooner or later uses them for loading storage coal, and we have yet to hear of one which was not able to effect economies over the hand gang or the big steam shovel.

The following 6-day coal loading record of the Northern Pacific in Montana is not presented here because it is exceptional, but, on the contrary, because it is typical.

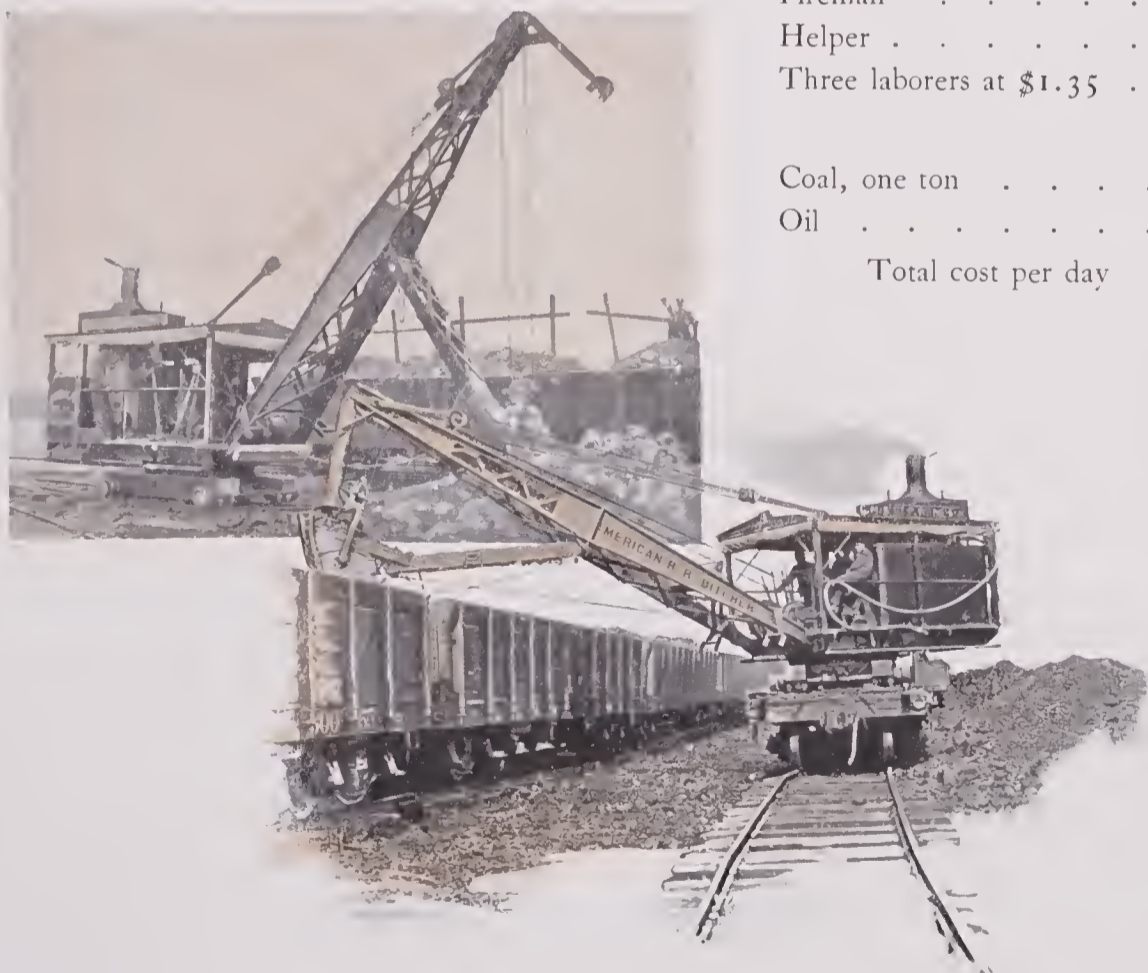
The coal was in a shallow, scattered stock pile, the American had to lay its own track and spot cars on the loading track. The coal-loading operation covered a period of 6 days. The following record shows what was done each day and what it cost per ton to load this coal.

*Monday*—Loaded five 50-ton gondolas.  
Actual working time, 5 hours. Cost per ton . . . . . \$.062  
*Tuesday*—Loaded six 50-ton gondolas.  
Actual working time, 6 hours. Cost per ton . . . . . \$.0525  
*Wednesday*—Loaded seven 50-ton gondolas.  
Actual working time, 6 hours. Cost per ton . . . . . \$.0475  
*Thursday*—Loaded seven 50-ton gondolas.  
Actual working time, 7 hours. Cost per ton . . . . . \$.0475  
*Friday*—Loaded five 50-ton gondolas.  
Actual working time, 6 hours. Cost per ton . . . . . \$.062  
*Saturday*—Loaded five 50-ton gondolas.  
Actual working time, 5 hours. Cost per ton . . . . . \$.062

*Note*—This work was done in November, 1916, when wages were not so high as now.

Below is table of costs per day. By making allowance for present wage conditions, the cost of doing the same work today can easily be determined.

|                                  |                |
|----------------------------------|----------------|
| <i>Crew Cost:</i>                |                |
| Engineer . . . . .               | \$4.50         |
| Fireman . . . . .                | 2.15           |
| Helper . . . . .                 | 1.75           |
| Three laborers at \$1.35 . . . . | 4.05           |
|                                  | <u>\$12.45</u> |
| Coal, one ton . . . . .          | \$4.00         |
| Oil . . . . .                    | .30            |
| Total cost per day . . . .       | <u>\$16.75</u> |



UNLOADING COAL FROM GONDOLAS

For this work the dipper and dipper arm are removed and a clam-shell bucket put on instead. Many roads have used the American for this purpose and held the cost per ton to a very low figure. The C. & E. I. unloaded 4754 tons of coal in this way at Villa Grove, Illinois, using a three-quarter yard clam-shell bucket.

The cost of the entire operation was as follows:

|                              |          |
|------------------------------|----------|
| Labor and supplies . . . . . | \$238.93 |
| Temporary tracks . . . . .   | 54.67    |
| Total . . . . .              | \$293.60 |

This makes the cost per ton \$0.0618. However, as this figure includes a number of items not usually included in such costs, we will give the actual cost of operating the American itself. The cost per day in wages, fuel and supplies, was as follows:

|                              |        |
|------------------------------|--------|
| Engineer . . . . .           | \$4.00 |
| Fireman . . . . .            | 2.25   |
| Helper . . . . .             | 2.00   |
| Fuel, supplies, etc. . . . . | .50    |
| Cost per day . . . . .       | \$8.75 |

An average of about 200 tons a day was unloaded. These costs are, of course, low in comparison with present-day figures, but allowing for the differences in wages, etc., an accurate idea of what similar work would cost today can be arrived at.



## COALING LOCOMOTIVES

This operation has been handled in different ways, by different roads. In cases where the coal was put into the tender direct from a stock pile it was found advantageous to leave on the regular dipper. In most cases, however, the coal was taken from gondolas necessitating the use of a  $\frac{3}{4}$ -yard clam-shell bucket.

As an unusually interesting and successful example of such use of the American, we will describe how it was used near Givens, Ohio, on the Northern Division of the C. & O. Railway.

These people had such great faith in the ability of the American Railroad Ditcher to coal locomotives economically, that they installed one of their machines as a semi-permanent coal-handling plant on a short trestle between the main line and a short spur, on the division which connects Sciotoville with Waverly. A string of "gons" loaded

with coal is switched onto the spur, and the American, operating a  $\frac{3}{4}$ -yard clam, puts this coal aboard the tenders. This installation has justified itself by doing some remarkably fast coaling. This machine has loaded 15 tons into a tender in less than 7 minutes.



This American is operated in two 12-hour shifts, no other help than an operator and a fireman being required for each shift.



### PLACING RIPRAP

The speed and ability of the American Railroad Ditcher to work in close quarters makes it an ideal machine for placing stone riprap along river banks to prevent wash-outs. Its value for this sort of work was demonstrated by the Big Four several years ago.

Along the White Water River the tracks of the Big Four run along the top of the steep banks which, when the river is in flood, are eroded rapidly. In order to prevent this and protect its tracks the Big Four Road undertook to place heavy stone riprap on the bank at the more exposed places. The stones weighed from 5 to 6 tons and were brought

in loaded on flats. The dipper and dipper arm were taken off one of the road's American Railroad Ditchers and a pair of stone grabs hooked onto the hoisting line. The ditcher then unloaded the stone and placed it on the bank at the rate of four cars an hour—or one car in 15 minutes. The ditcher was chained to the car while making the lifts, though this really was not necessary. It was thought wise to do it, however, on account of the dangerous location in which the work had to be done.

The crew consisted of 4 men: the ditcher operator and his fireman, and 2 men to adjust the grab hooks. The

labor cost per day was \$9.00.

The bank below the track was very steep and the ability of the ditcher to place this heavy riprap stone solved a knotty problem for the road—not to speak of the saving effected.



## LIGHT WRECKING

On account of the fact that the American Railroad Ditcher is easily prepared for shipment, and can be hustled to the scene of a wreck long before the regular wrecker could be got ready, it is often used as a wrecking crane for handling light wrecks. Its sturdy build enables the American to handle loads that look totally beyond its capacity. In this way, by preventing a tie-up of even but a few hours' duration, an American can save hundreds of dollars for the road.

When nine cars, four box-cars and five flats went off the track and

turned over, on the Jonesboro, Lake City & Eastern, the road's American Railroad Ditcher was detailed to pick up the wreckage and open up the line for traffic. The cars had gone off a trestle 8 feet high, landing in a heap in 4 feet of water.

Three of the flat cars were picked up first and put on their own trucks on the track. The other two flats were placed upon these. The American picked up the flat car bodies, without the trucks, and lifted them high enough to load on the other flats. The box cars were handled one end at a time.



LOCOMOTIVE CRANE WORK



The probabilities are that sooner or later every owner of an American Railroad Ditcher finds himself with an emergency locomotive crane job to do, and no crane available. Being up against it, he naturally sends his utility player, the American to tackle the job. Almost invariably he is surprised and delighted at the way the machine does the work, and thereafter it is increasingly hard to confine the machine exclusively to ditching work.

Up to its capacity, the American Railroad Ditcher really is a "top notch" locomotive crane. It will handle with speed and complete safety any load up to 5 tons. It slews a full circle, travels in either direction under its own power, is economical of coal, and is independent of the permanent track, being equipped with portable track sections, which it transfers as it progresses.

Practically every road owning an American has used it for locomotive crane work.

The Southern Railway used one of their Americans to load some 6-yard dump cars into flats. The cars weighed 8 tons apiece, and one which was partly filled with dirt weighed more than that. Six of these cars were loaded in 38 minutes actual working time.

The Idaho & Washington Northern Railroad Company have used their American extensively for locomotive crane work about the shops and yards, and out on the line. It is interesting to note that these people bought an auxiliary car body, mounted on 8-wheel swiveling trucks on which they mounted their ditcher for locomotive crane work in the winter. They have picked up wrecks, handled ties 86 at a time, picked up and loaded a 3-yard shovel and shovel arm for a large steam shovel, etc. This machine

has also been used to load and unload rails, lay track, load logs, ties and timbers and for miscellaneous "B. & B." work.

The Waterloo, Cedar Falls & Northern Railway Company is another road that has used its American Ditcher effectively for doing locomotive crane work. Most of their work was done around the shops, handling car wheels, parts of trucks, etc.

When the Santa Fe's yard crane at San Bernardino, California, broke down they pressed one of their American Railroad Ditchers into service to take its place, which the

American did in an entirely satisfactory manner.

Foley Brothers used their American Railroad Ditcher to lift a 40-foot gasoline launch out of Lake Nipigon and place it on a flat car for shipment. The launch weighed in the neighborhood of 7000 pounds and the water was 12 or 15 feet below the rails. As the ditcher was mounted on a flat car, it will be seen that the lift was considerable.



## TRAVELER FOR "B. &amp; B." WORK

The American Railroad Ditcher has been used so extensively for this class of work that it is difficult to decide just what specific operation to describe at length, as best emphasizing the ability of the American to do this class of work speedily and economically.

However, because it combined rapid emergency work with low cost, we believe that the trestle building job of one of the Missouri Pacific's American Railroad Ditchers perhaps will serve to illustrate most strikingly the ability of the American to handle this important class of work.

On May 30th a tornado struck Lawrence, Nebraska, and did serious damage. Among other things, it wrecked a high timber trestle on the Missouri Pacific and completely tied up the line. The all-important thing for the railroad then, of course, was to get the bridge rebuilt and up again for traffic. The nearest

American was at Auburn, Nebraska, and at 8 P. M. a hurry-up call was sent in for it to leave at once via the C. B. & Q. for Lawrence. At midnight on Friday, the 31st, the American reached Lawrence and tied up until 5 A. M. at which time work was commenced on the bridge.

All timbers were handled and hoisted into place by the American. The bents were built flat on the ground and then hoisted into place by the ditcher and held in position while the bridge gang braced them. While hoisting and setting the bents the ditcher was chained to the car, but for placing the stringers, ties, rails, etc., it was left loose so that it could run back to the material car and pick up the material. Work was pushed rapidly and kept up for 12 and 14 hours a day, and by noon of the following Tuesday the bridge was done and the line reopened—4 days to complete the job.



The cost of doing this work with the American was 40 per cent under the advance estimates of the men in charge, and they said that if they had been forced to depend on hand labor to rebuild the bridge it would have taken three 10-men gangs 8 days to do it; and mustering gangs like this on such short notice is not the easiest thing in the world these days.

### WRECKING OLD BRIDGES AND TRESTLES

The American has also been used extensively for taking down old bridges and trestles. It does such work so cheaply that some roads have found it economical to pick up and dispose of old bridge material which otherwise would



have been left upon the ground, because it would cost more to pick it up than could be realized from its sale.



### RAISING TRACK

At this class of work the American has demonstrated its ability to greatly reduce the size of the labor gang required and to simplify and speed up the work generally.

In the summer of 1916, the Chicago, Milwaukee & St. Paul road distributed 15 miles of gravel near Madison, South Dakota. The gravel was unloaded from hopper bottom cars and the work of raising was then started, with a gang of 45 laborers. The work had no more than got well started, however, when trouble with the laborers developed and, eventually, it became necessary to let the whole gang go when only about 4 miles of the gravel had been put under. This left the road facing a serious problem, as the gravel, which had been dumped on the track filled it inside and out to such an extent

that it would be impossible to run a flanger or a snow plow. Hiring another gang was out of the question, yet something had to be done. In his dilemma, W. H. Crabbs, the roadmaster in charge, suddenly thought of his American Railroad Ditcher, as many another good roadmaster has done when in trouble. He took off the shovel and shovel arm, leaving the bail and bail block in place. Then he had a sort of spreader attachment made with a rail tong fastened to a chain at either side. He then set the American and a crew of 14 laborers at the track-raising job.

The ditcher fulfilled Mr. Crabbs' expectations so well that in 17 days the first raise of 6 to 8 inches was completed on 11 miles of track, an average of over 3000 feet a day.



## CLEANING UP SLIDES



Every year railroad men in all parts of this country and Canada have reason to bless the American Railroad Ditcher for its slide fighting value. This includes its activities in widening and adequately ditching deep cuts, which is the proper way to combat slides, of course. But this cannot always be done, and slides are bound to occur now and then, calling for "emergency" treatment.

The American Railroad Ditcher is an ideal slide-fighting machine, especially in cramped quarters. When a steam shovel is available and it is possible to cast over the material or load it onto cars on a passing track the steam shovel does very well, but it is seldom indeed that all these conditions jibe. Generally, the steam shovel is in a pit at the other end of the line and when this isn't the case the slide most likely is in a narrow cut where the digging will have to be straight ahead and the dumping into cars directly

behind; and this is decidedly out of the steam shovel's line. It's a case of either a hand crew or an American Railroad Ditcher; and a hand crew is neither fast enough nor economical enough to handle slides satisfactorily; so that the case really narrows down to the old reliable American Railroad Ditcher, which can be moved at train speed on its flat car from any point of the line long before a steam shovel could be prepared to make the journey.

Following are a few brief statements of the American's slide-handling ability.

The Baltimore & Ohio used one of its Americans with great success near Fairmont, West Virginia, cleaning up a bad slide. The slide was a heavy one which derailed several cars. They tried to clean it up with a steam shovel, the intention being to cast the material over into a creek bed that paralleled the track, but the steam shovel

boom was not long enough to dump the material clear of the roadway. The American Ditcher was steered into the slide, which it cast over cleanly at the rate of 75 yards an hour. The material was yellow clay mixed with rock, and so sticky that every dipperful had to be poked out with the plunger.

The Louisville & Nashville also had a gratifying experience with the slide handling ability of the American. One of their contractors accidentally set off a blast of storage powder and dynamite consisting of 55 kegs of powder and 250 pounds of dynamite near Irvine, Kentucky, on the L. & A. branch. The explosion caused a big "slip" which completely buried the track. The American was ordered out at once. It headed into the slide at 1 P.M. and at 9 P.M. the same night the slide was cleaned up and traffic reopened. Short rail sections were

used to enable the ditcher to get close in, and the material was cast over the embankment. In 8 hours, the machine handled 1100 yards. The L. & N. organized this machine into a regular "Slide Patrol." Every morning it was sent out 1½ or 2 hours ahead of the first train. In this way it cleaned up many slides which would otherwise have delayed train service.

When a cloudburst caused a series of bad slides along the main line of the Ore.-Wash. R. R. & Nav. Co., near La Grande, Oregon, the American saved this road from a serious tie-up of traffic. Material had been washed onto the track to a depth of from 2 to 10 feet, for a distance of 400 feet. This material was of such a character that it would have been extremely difficult to handle it with teams and scrapers or pick and shovel. But the American cleaned it up completely in 6 hours.



## SNOW HANDLING



Snow handling usually is an emergency job which must be cleaned up quickly. During the last 2 or 3 years, since the labor shortage became acute, many roads have been caused no end of trouble by heavy snow; but they were not roads that own American Railroad Ditchers. Many roads have tried out the American as a snow handler, and all have found it to be speedy and efficient. The experience of the Copper Range Railway is a good typical case. In the winter the problem of keeping their yards clear of snow is a serious one with them. After every heavy snow-fall it is necessary to remove the snow piled up between the tracks by the plows.

When done by hand labor, this was always a slow and expensive job, but since they started to do it with their American they have had no trouble. For this work they equip their ditcher with a 2-yard clam-shell bucket and mount it on a flat car between two 50-yard gondolas. With this outfit they have handled 650 yards of snow in 7 hours. The



American also unloads the snow from the gondolas. Of course if dump cars had been available more snow could have been handled.

This work was done in the Copper Range Railway's yards at

Houghton, Hancock and Calumet, Michigan, and officials of this road state that the American has handled snow at a saving of 75 per cent over what it used to cost them when they did the work with hand labor.

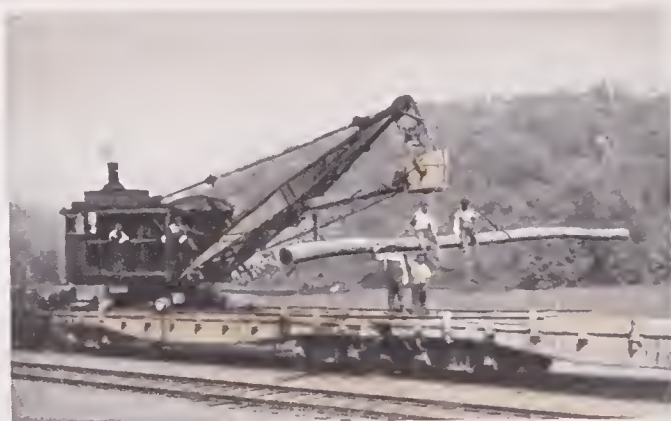
### SETTING TROLLEY POLES

Setting poles along the right-of-way is a job, which can run into a lot of money if it has to be done with a hand crew. However, a number of roads owning American Railroad Ditchers have found a way to do this work for a very low figure and much faster than it could be done the old way.

We have record of a number of roads that used an American Railroad Ditcher to distribute and set poles and the method of each varied to some extent from that of the others. Perhaps the way the Waterloo, Cedar Falls and Northern Railroad Company went at it is most typical.

On this operation, the ditcher was mounted on a flat car with the poles on a car behind it. One man on the pole car fastened the lifting chain to the poles while another man on the ground guided the poles into place, the holes having been dug previously. These 2 men, with the operator and fireman of the ditcher,

did work which formerly it had taken 42 men to do. That is 4 men and the American Railroad Ditcher set as many poles in a day as 42 men would have been able



to set. The poles set varied from 35 to 60 feet in length and they were 7 inches in diameter at the small end.

The poles were set 100 feet apart. To illustrate the speed at which the work was done, from the time the chain was unhooked from the pole, until the train moved ahead and the next pole was set and the chain ready to unhook again, the elapsed time averaged 1 1/2 minutes.

## STUBBING TROLLEY POLES



The Spokane & Inland Empire System, an electric line which runs from Spokane (Washington) to Coeur d' Alene (Idaho), Palouse (Washington), and other points in this rich agricultural section, decided to give their American Railroad Ditcher a try at stubbing trolley poles

which had rotted at the ground line; so they rigged up a set of light swinging leads, hung them to the point

of the ditcher boom and drove the stubs in a fraction of the time that it would have taken to set them by hand. What was more important, they saved about 75 per cent of what it would have cost them to do the work by hand, and did a better job, for the earth around a stub that has been placed in a hand-dug hole is soft, while the earth around the stubs driven by the American was compact and held them rigidly.

The American drove stubs at any angle and averaged a stub every 5 minutes when it was not necessary to move farther than the next pole (120 feet).

## RAIL HANDLING

Rail handling is one of the "orneriest" propositions the railroad man has to contend with, where hand labor is used. In the first place, a hand crew of 25 or 30 men is absolutely necessary where 90 or 100-pound steel is handled and, naturally, the heavier the steel the less they do.

But the cost and slowness of the gang method of handling rails is not its only drawback; the big crew required causes confusion, and confusion is a great breeder of accidents. Serious injuries to laborers are not at all infrequent. Moreover, rails thrown from a flat car by a hand crew are not going to be improved noticeably in the process. In fact,

it is said that wrecks have been traced to rails injured, when thrown from cars. Another thing, it is very certain that no good is done to the ballast berm by dumping rails upon it.

When we say that the American Railroad Ditcher is the most efficient and economical rail handler made, we only repeat a statement made by practically every railroad man who has used the machine for this work. Its first move in the direction of economy and efficiency is to make possible a reduction in the crew of from 30 men to 6. This crew is made up of the operator and fireman of the ditcher, and 4 laborers.

### UNLOADING RAILS

The Susquehanna and New York Railroad Company have used their American Railroad Ditcher unloading rails and have made some remarkably low handling cost records. On August 8th, 1915, they unloaded and distributed along the main track for relaying, 200 tons of 80-pound rail with work train and American Ditcher. Unloading started at 9:45 A. M. and completed at 5:30 P. M. During the work it was necessary to clear for six regular trains, which were passed at a siding 2 miles from the work. The cost was 22 cents per gross ton, including work train and crew.

The Chicago Great Western Railroad Company has used its three Americans with great success for unloading rails. It is not an unusual thing for them to unload a gondola loaded with ninety 33-foot, 100-pound rails in one hour, placing them on either side of right-of-way in proper position for laying. They have unloaded ninety 33-foot rails in 35 minutes, placing

the rails at each side of the track ready for laying.

The Vandalia Railroad used an American Railroad Ditcher with great success unloading 100-pound steel. They averaged 100 rails an



hour, but loaded as many as 97 rails (50 tons) in 40 minutes. The average daily loading record was 1000 rails, and the saving over the cost of doing the same work with a hand crew \$35.00 per day.



## LOADING RAILS



When the Northern Pacific Railroad put an extra gang of 30 men to work loading 70-pound steel and all conditions were favorable they expected to get about 600 rails loaded a day, an average of one rail a minute. When the same crew was put to work loading 85 and 90-pound rails, the daily average fell to 500 rails—and at that they couldn't always get the laborers when they wanted them.

So one day they “sicked” one of their Americans on the job. The crew consisted of the operator,

a fireman and 3 laborers—5 men in all, not counting the train crew. Working at a moderate gait the American easily loaded 1000 rails in 10 hours—and it didn't make a bit of difference whether the rails were 70-pound or 90-pound.

As a general thing, when the American is used for loading rails a crew of 3 laborers is used besides the engineer and his fireman. Two of the men are stationed on the ground; one to hook the tongs and the other to guide the rail as it is swung into position.



LOADING RAILS

Based on the results obtained by the Northern Pacific the saving effected by the American over the hand crew figures out as follows:

|  |         |
|--|---------|
| Ditcher operator, per day . . . . .                      | \$5.00  |
| Ditcher engineer, per day . . . . .                      | 2.50    |
| Three laborers at \$2.00 per day . . . . .               | 6.00    |
| Coal, oil, etc., per day . . . . .                       | 2.50    |
| Cost of operating ditcher, per day . . . . .             | \$16.00 |
| Cost of work train, per day . . . . .                    | \$35.00 |
| Cost per rail, exclusive of work train expense . . . . . | \$0.016 |
| Cost per rail, including cost of work train . . . . .    | \$0.051 |

Cost of doing work with hand crew of 30 men, based on \$2.00 per day, per man.  
30 × \$2.00 = \$60.00, total cost of hand crew per day.  
Six hundred 70-pound rails per day at labor cost of \$60.00; 10 cents per rail, exclusive of cost of work train.

Five hundred 90-pound rails per day at labor cost of \$60.00; 12 cents per rail, exclusive of cost of work train.

Cost of loading by hand with cost of train figured in.  
\$35.00, cost of work train per day.  
\$60.00, labor cost per day.  
\$95.00, daily expense loading by hand.  
Six hundred 70-pound rails at \$95.00 = .158 per rail.  
Five hundred 90-pound rails at \$95.00 = .19 per rail.  
This shows a saving for the American of from \$0.107 to \$0.139 per rail.

Above figures are based on pre-war costs

OTHER ADVANTAGES

In addition to actual saving per rail affected by the American, there are other advantages well worth consideration; cars are more uniformly loaded, ballast berm is not damaged by men tramping on it, the danger of injuring the men is eliminated; and bunking, feeding and transporting the hand crew is done away with. Furthermore, when bad weather prevents work, only a limited number of men are idle. The American handles to or from a gondola as easily as a flat, while men cannot load into a gondola at all. An especially great advantage which the American possesses is that it can pick up rails out of water and from behind telegraph poles, and pull them up steep grades. It is not necessary to stop the train when picking up rails; with the American, rails can be picked up from both sides of the track and the train kept on the move.

HANDLING TIES

Several years ago on the Atlantic Coast Line, they began to load their ties on flat cars with one of their American Railroad Ditchers and found that they were able to save more than a cent a tie over the old method of loading by hand into box cars. The ties were piled on the flat cars lengthwise in three piles of 75 ties each, 300 in all.

The ties loaded were piled along the track according to A. C. L. specifications in piles of 16 and 2. The piles of ties were 20 feet from the track, with a ditch between.

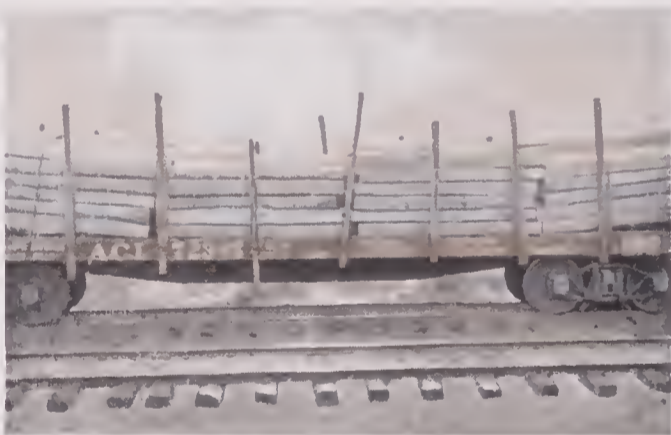
Two laborers on the ground placed the chain around the bundles, two on top of the car squared up the load, and fastened the piles with load binders.

Six hundred and fifty ties were loaded per hour, the cost per day being as follows:

COST OF LOADING PER DAY

|  |         |
|--|---------|
| Operator at \$100.00 a month . . .                           | \$4.00  |
| Eight laborers at \$1.50 a day . . .                         | 12.00   |
| Fireman at \$1.50 a day . . .                                | 1.50    |
| Coal, 3/4 ton at \$3.50 . . .                                | 2.62    |
| Oil, waste, etc. . . . .                                     | .50     |
| Interest on ditcher at 6 per cent<br>on \$6,200.00 . . . . . | 1.20    |
| Depreciation on ditcher at 6 per<br>cent . . . . .           | 1.20    |
| Interest on car equipment . . .                              | .41     |
| Depreciation on car equipment at<br>25 per cent . . . . .    | 1.73    |
| Total . . . . .  | \$25.16 |

Above figures based on pre-war costs



FOURTEEN YEARS ON LINE

Working 6 hours a day, loading 650 ties an hour, will load 3900 ties a day, at a cost of \$0.0064 per tie. The actual cost of loading ties by hand into box cars is not less than 2 cents each. Thus the American Railroad Ditcher will load ties onto flat cars at a cool saving of \$0.0136 per tie. At that, the table includes many cost items not taken into account when ties are handled the old way.

Loading, say, 1,000,000 ties a year at a saving of \$0.0136 per tie will amount to \$13,600.00 per year.

ROAD BUILDING

One of the best all-around samples of the road-building ability of the American Railroad Ditcher was exhibited during the construction of a 6400 foot spur by the Cleveland Cliffs Iron Company. The ditcher did all the work from the initial clearing and grading to surfacing the track.

The cost of work done on this spur by the American was distributed as follows:

|                                      |           |
|--------------------------------------|-----------|
| Clearing . . . . .                   | \$243.98  |
| Grading . . . . .                    | 724.36    |
| Ties . . . . .                       | 498.75    |
| Laying and lifting steel . . . . .   | 374.29    |
| Surfacing . . . . .                  | 233.79    |
| Engineering . . . . .                | 87.90     |
| Surveys . . . . .                    | 11.80     |
| Depreciation boarding cars . . . . . | 18.66     |
| Total . . . . .                      | \$2193.43 |

The original estimate of the cost of doing the work was \$2266.00, so they beat it by \$73.00.

ESTIMATE OF HAND WORK

- Clearing 8.81 acres at \$35.00 per acre.
- Grading 3251 cubic yards of earth at 21 cents per cubic yard, \$682.71.
- Grubbing 448 square rods at \$1.15 per square rod, \$515.20.
- Surfacing 6400 feet at \$4.00 per 100 feet, \$256.00.

ESTIMATED COST OF HAND WORK COMPARED WITH THE COST OF DOING IT WITH DITCHER

|                     | Estimated Cost of Hand Work | Cost with Ditcher | Saving Effected by Ditcher |
|---------------------|-----------------------------|-------------------|----------------------------|
| Clearing . . . . .  | \$308.10                    | \$243.98          | \$64.12                    |
| Grading . . . . .   | 1197.91                     | 724.36            | 473.55                     |
| Surfacing . . . . . | 256.00                      | 233.76            | 22.24                      |
|                     | \$1762.01                   | \$1202.10         | \$559.91                   |

Or a saving of 32 1/2 per cent. Prices based on pre-war costs.

### CLEARING

The Cleveland Cliffs people found stuff back out of the way, and that that all that was necessary was to the machine would take care of move the cordwood and salable the rest.

### GRADING

The grading, which combines half as much dynamite as under old grubbing and earthwork, shows the methods; a very important saving largest saving. They used only about in their country of heavy grubbing.

### SURFACING

While the saving shown in the figures is small they did an A No. 1 job and put the track in such shape that it will require very little attention for the time that it is in. This item also includes the cost of putting in tie plates and braces, which had not been done before and which increased the cost materially.



## HOW BIG LOGGING COMPANIES USE THE AMERICAN FOR ROAD BUILDING

Every year the large logging companies construct many miles of new track and tear up much old track from logged over sections. Much depends on the economy and rapidity with which this important track work can be done. Long ago, the idea of doing it with labor gangs had to be given up, partly on account of the expense, partly on account of the growing difficulty of

securing enough men to put the work through on time.

On account of its quickness, adaptability and strength the American Railroad Ditcher was given a try at this work. It made good at once. It was tried out at everything, from making the initial cuts and fills to laying and ballasting track, and when it got done they quit calling it a ditcher and called it the American Road Builder.

On the following pages we will give a brief account of some of the high spots of the road-building work of the American.



*The* AMERICAN RAILROAD DITCHER



Grading for Logging Track

## GRADING FOR LOGGING TRACK

While most logging roads must traverse very difficult country, their temporary nature makes it necessary to hold the construction cost down to the lowest possible figure. When labor is scarce and costly, it is hard to make much of a showing at this work in the way of low cost figures. The Potlatch Lumber Company, however, has found a way to do this and make itself practically independent of the labor situation. It accomplishes this by building its road complete, from initial grubbing and grading to laying track, with the American Railroad Ditcher.

The work being of a temporary character, considerable latitude is allowable in the method used, the main idea being to get logs to the mill at the lowest cost per foot. Things that would give a regular railroad man the "jim-jams" are perfectly "de rigger" in building a logging road; for instance, the way the Potlatch Lumber Company makes fills when material is scarce. First, let us explain that the general practice followed by these people in making fills is to dig out dirt on the side with the ditcher and dump in front, moving the ditcher forward over the fill as completed. The weight of the ditcher and its

portable track sections helps to compact the fill. Sometimes, of course, the fill has to be made pretty high; so high that it is impossible to reach all the material needed with the regular dipper. In a case like that the ditcher pulls in logs from the sides and piles them up in front so as to build up the fill. Material is then dug from the sides and placed on top of them to bring the fill up to grade. No cars at all are used in the work of grading, the American does it all.

The Potlatch people, not long ago completed a logging spur on which the ditcher made an 8-foot cut on a 6 per cent grade. The cut was about 300 feet long. The ditcher also made an 8 to 10-foot fill 500 feet long. This was a 4 per cent grade.

Short rail sections are used for this work, and as much of the time the ditcher has to work over soft new fill and sometimes over swampy ground, ties are spiked to the short rail sections very close together to give a solid working base.

In grading with the American they move from 400 to 800 yards a day, depending on the nature of the ground and the interference from trees.

## LAYING LOGGING TRACK

When the Potlatch Lumber Company wants to lay a new logging spur the American is headed into the work with a car of rails and a car of ties behind it, the rail car being placed next to the ditcher. They use 60-pound rails, 33 feet long, and pole ties, 17 ties being used to each rail length. The ties are piled high on the car. Two men on the tie car make the ties up into bundles, which are picked up by the ditcher and swung around onto the grade ahead. Six men on the ground place these ties in position. One man is used on the rail car to hook the center tongs, which are of a special, non-teetering type. There is one bolter out in front of the ditcher and two men to heel the rail into the rail joints and put on the bridles. There are thus 11 men on the ground ahead of the ditcher.

The angle bars are piled on the forward end of the rail car and there is one man whose job it is to put these on the rails. One man is employed in carrying bridles ahead, to be used as fast as rail is laid up to



them. These, together with the operator and fireman of the ditcher, make the crew actually employed in laying track consist of 16 men. The gang being made up as follows:

Six men ahead on the ties

One bolter

Two men laying rails and putting on bridles

Two men on the tie car

One man placing angle bars on the rails

One tong hooker

Two men on the ditcher

One man carrying bridles

Total, 16 men



### PICKING UP OLD TRACK

The spiking crew working behind the ditcher was made up of 2 bolters, 15 spikers and 1 spike peddler—18 men in all—which brings the total of the track-laying gang up to 34 men. This crew with the American, can lay 3000 feet of track a day on heavy grades, and where there are trees on the right-of-way which must be cleared off. Without these hampering conditions they claim that they could lay a mile of track a day without any trouble at all.

All the extra equipment they require is two tie slings, made from a couple of lengths of cable, with a hook on each end, and a pair of rail tongs.

The method of handling rails is shown in one of the accompanying pictures. The American runs out to the end of the car so as to swing the near end of the rail slightly beyond the rail joint. The machine then backs up until the line that holds the rail is at a considerable angle, in which position the weight of the rail pushes itself into the rail joint. The rail tongs are constructed

so that they release as soon as the rail rests on the ties.

By using the ditcher for laying track the Potlatch Lumber Company saves the wages of 25 men a day. As they are paying this kind of labor \$3.50 a day, the saving is a worthwhile one.

For taking up old track and loading the material, the Potlatch Lumber Company organize their work train and crew as follows: The American Railroad Ditcher on its flat car is coupled between two empty flats. The car in front of the ditcher being intended for the rails that are picked up, and the one behind it for the ties. The crew is made up as follows:

Two men on the ditcher  
Four men pulling spikes  
Two unbolters  
Four men bunching ties  
One rail and tong shooter  
One spike picker  
Total, 14 men

These men are all working in front of the work train. Behind it is another gang made up of 4 spike pullers, 2 unbolters, 1 spike picker—7 men in all. There are also 4 tie pilers on the car.



The men in front of the work train pull half of the spikes and remove all but one bolt from the rail joints. When the train has passed over the track, the crew behind removes the rest of the spikes, and the remaining bolts and angle bars. The angle bars are removed entirely and placed on the end of the car.

While the ditcher boom is not long enough, of course, to reach across the rail car and pick up the rails and ties on a straight lift, this is done by turning the boom at a slight angle to the track, hooking on the rail tongs, and giving a slight jerk. This pulls the end of the loose rail free and then they snake it along the ground until they can get a straight lift on it, when one of the men shoves the tongs to the center of the rail,

which is then picked up and placed on the car ahead.

The Potlatch people used two rail tongs for this work and were able to pick up about 3000 feet a day and do away with a gang of from 16 to 20 men, whom they would have had to pay \$3.50 a day.

The Potlatch people also have another way of doing this same work. They put the American on the rear end of the train with the rail car immediately in front of it and the tie car in front of that. With this arrangement it is very much easier to pick up the rails and ties. They use trams which run back and forth on the rail car to carry the ties up to the tie car. These trams are merely sections of live rollers like those used in lumber mills.

About the same amount of work can be done with this arrangement as with the one previously described, and it depends somewhat on the grades and curves which method is used.



## FOURTEEN YEARS ON LINE

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### A FEW "REASONS WHY"

there are over 500 Americans in *daily use* on both large and small roads. This is told you in the words of people who are not trying to sell you something but are glad they bought Americans. Properly interested parties will be referred to these or any number of other satisfied American Ditcher owners.

### HAVE ANOTHER AMERICAN ON ORDER

"We make our American Ditchers *do what we want them to do, and we also find that the American can be made to do it.* We have another American on order and are anxiously awaiting delivery, as we contemplate a busy ditching season for all four of our machines for the year 1919."

*Oregon Short Line Railroad*

### PAID FOR ITSELF IN TWO WEEKS

"The machine has proven very satisfactory as a railroad ditcher and has already (in service two weeks) *more than paid for itself* in this class of work."

*Idaho & Washington Northern Railroad*

### NINE TO THIRTEEN CENTS PER YARD

"Our American has been ditching and putting the dirt on the dump on a weekly average of from 9 to 13 cents per yard. I think between 10 and 11 cents would be a general average." (At prices prevailing in 1914.)

*Santa Fe System*

### BEST LIKED MACHINERY WE HAVE

"I am handling four steam ditchers made by your company, and will say that they are really the most popular and best liked machinery we have. I am outlining a future, which if carried, will call for more of these machines." (They now have eight.)

*Rock Island System*

### VALUABLE IN SMALL WRECKS

"I am not able to tell you the exact amount of yardage it will handle, but would unhesitatingly recommend the use of this machine with the ditcher-shovel attachment. You know you can take this off and it can be used for unloading coal, loading cinders, and in fact, doing most any kind of work. The shovel can be removed in about an hour, and it then becomes a first-class crane. It is also very valuable in small wrecks, as a wrecking outfit."

*Arkansas, Louisiana & Gulf Railway*

(The above was written to a third party who later bought an American.)

*The* AMERICAN RAILROAD DITCHER

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## FOURTEEN YEARS ON LINE

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### MACHINE WOULD SAVE MONEY

“I am trying to get one of our American Ditchers from another division, but so far have failed because they are all busy. Insofar as I am concerned, it would be a waste of time to send a man to see me, as I am thoroughly convinced of the merits of the machine, and *know that it would save money* for the railroad company.”

*Santa Fe System*

### PAY FOR THEMSELVES THE FIRST YEAR

“They easily pay for themselves the first year of their work in money saved.”

*Rock Island System*

### MOST PROFITABLE INVESTMENT EVER MADE

“I am pleased to state that the American Railroad Ditcher you sold us one year ago has given a most excellent account of itself and we believe it to be one of the most profitable investments in the way of machinery this company has ever made.”

*Fort Smith & Western Railroad Company*

### SHOULD BE ON EVERY ROAD

“The American Ditcher should be on every road in the country. A first-class road is not properly equipped without it.”

*Rock Island System*

### DOING THE WORK OF 125 MEN

“It is a pleasure for me to say the American Ditcher is coming up to my expectations in every respect, and I am truly proud of the machine. It is doing the work of at least 125 men, for which we would have to pay each \$1.25 per day.” (Prevailing in 1914.)

*Georgia & Florida Railroad*

### CANNOT RECOMMEND IT TOO HIGHLY

“During the recent troubles we had in the Cascade Mountains, the American Ditcher was the greatest help we had in opening the line, and I cannot recommend it too highly.”

*Chicago, Milwaukee & St. Paul Railway*

### PAID FOR ITSELF THE FIRST SUMMER

“We consider it paid for itself the first summer, and in a country where so much ditching is required, as is the case with us, we could not afford to be without it.”

*Minnesota & International Railway Company*

### COST OF REPAIRS VERY LOW

“For the past 6 months we have had one of the American Ditchers in use on this work and it is giving excellent service, the cost of repairs being very low.”

*Oregon Short Line*

## *The* AMERICAN RAILROAD DITCHER

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### THE AMERICAN BOOM POINT PLUNGER SAVED THE DAY

“The material loaded today was the worst of gumbo. X——Ditcher (not made by you) was working in this cut some time ago, and had to give it up because the gumbo stuck in the dipper and could not be removed with any degree of success. *The X——machine loaded four cars per day and we loaded eighteen cars with the American*, and cleared for several trains. It would have been impossible to accomplish anything without the plunger at boom point of the American to push the gumbo out of the dipper.”

*Baltimore & Ohio Railroad*

### ELIMINATES WRECKER, CRANE AND STEAM SHOVEL

“*I consider the American the best piece of machinery we have*, and use it in a great many places where we heretofore found it necessary to have the wrecker, crane or steam shovel and crew, and which, of course, was always more expensive.”

*Charles Hebard & Sons, Lumber Operators*

### ACCOMPLISHED MORE THAN THEY EXPECTED

“Our Superintendent of Tracks has told me that he has been *doing work with the American that was not contemplated and that he did not suppose was possible to do with the machine when it was purchased*. We have less than 100 miles of track. The American has proven to be a valuable machine in many ways, and the results have been everything you claim for it.”

*Lehigh & Hudson River Railway Company*

### SORRY DID NOT ORDER TWO AMERICANS

“We are very much pleased with our American Road Builder and Ditcher, and do not see how we could get along without it. *If we had known what we do now about this machine, we would have ordered two instead of one* last fall, as we have plenty of work for two of these machines to do.”

*Marshall Butters Lumber Company*

### SIDE TRACKING H——L FOR US

“Beg to advise I am now using one of our American Ditchers on the—— Division, and *it certainly is sidetracking h--l for us*. I cannot speak too highly for the American and the work it is doing for us.”

*Southern Railway Company*

### BEST MAINTENANCE TOOL THAT WE HAVE

“We have fifteen of them in service on this line, and I am working one on this division. It has given excellent satisfaction and I consider it *the best maintenance tool that we have*.”

*Northern Pacific Railway*

## FOURTEEN YEARS ON LINE

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### WORK OF AT LEAST 100 MEN

“I figure this machine will do the work of at least 100 men.”

*Raleigh & Southport Railway Company*

### CANNOT GET ALONG WITHOUT IT

“Our American Ditcher is doing fine, and I don’t see how we could get along without it. I never lose a chance to speak favorably of the American Railroad Ditcher. It is the best thing I have ever seen in the way of a ditcher.”

*Georgia & Florida Railway*

### BEAT CONTRACTOR’S PRICE 32 CENTS PER YARD

“The lowest bid we secured on this work from a contractor was 60 cents per yard, but we cleaned it up easily with the American at 28 cents per yard.”

*Susquehanna & New York Railroad*

### AVERAGE FROM 22 TO 35 CARS DAILY

“The American Railroad Ditcher is the best piece of machinery I ever had any experience with. I average from 22 to 35 cars daily, 20 yards to the car.”

*St. Louis Southwestern Railway*

### LOAD 25 TO 30 CARS OF BALLAST WITHOUT ENGINE OR CREW FOR SPOTTING

“You will note from enclosed picture, arrangement of tracks allowing us to load a full train of cars without train crew or engine to do spotting. We easily load twenty to twenty-four 30-yard Rogers Ballast cars per day. Locals simply take out loads and put in empties.”

*Kansas City, Mexico & Orient Railway Company*

### OPERATED 17 MONTHS WITHOUT DELAY FOR REPAIRS OR ADJUSTMENTS

“One of our American Railroad Ditchers was operated for 17 months without losing any time due to repairs or adjustments. In all that time it was not necessary to adjust the frictions.

*Oregon Short Line*

## A CLINCHER

One day while the president of a southwestern railroad was riding over the line with a railroad contractor who had done a large amount of construction work for him, the conversation turned to the question of roadbed drainage, the president confessing that this was a problem that gave him unlimited grief.

The contractor countered with a very natural suggestion: "Why don't you get a couple of American Railroad Ditchers, and cut out the grief?"

"Can't afford it!" said the president. "Why, Bill, just look at the investment it means, not only for the two American Ditchers, but for the dump cars, spreader, flat cars, and engine that I'll have to keep tied up. Hell, man, the very thought of it scares me to death!"

"Yes that's just the trouble," replied the contractor, "you let the cost blind you to the results. Now, if I were in your boots, I'd get not one, but two Americans, I'd put 'em in one ditching train, to hold down the train service cost, and I

wouldn't be afraid to bet my last shirt that they'd pay for themselves in a comparatively short time."

"Well, as long as you are so enthusiastic," said the president, with a smile, "and have such boundless faith in the American Railroad Ditcher, maybe you'll be willing to gamble on it. You get the outfit and do the ditching. I'll be satisfied with a 10-cent a yard saving on what it costs me now to do it with teams and labor. All you save under that will be your profit."

"You're on!" said the contractor, "I've never owned an American but I've seen 'em work enough to know that this is no gamble that I'm taking up, but a sure-shot win for me. I'll be glad to take a 6-month contract at 10 cents a yard less than it is costing you now to dig your ditches, but I warn you in advance that I'm going to make more than a legitimate profit on this deal. I want to say, though, that while it is not my nature to despise a profit, especially the kind



of a profit I'm going to rake out of that job, I am even more anxious to prove my point, and therefore I'll be willing to turn the American Ditchers over to you as soon as you are convinced of their value to your road."

The result was that two American Railroad Ditchers were purchased by the contractor, and ditching operations begun with an American Double Ditcher work train. It took less than 4 months to convince the railroad president that this was the only economical way of digging right-of-way ditches, and at the end of that time he was very glad to have the contractor fulfill his promise to turn the machines over to the road.

The railroad president had now been convinced of the value of the American for digging right-of-way ditches, he was soon to find out that it was just as efficient in other lines.

The second day after freezing weather forced the stoppage of ditching operations, an important

coaling station was burned to the ground. Here was a situation that any railroad man can appreciate; engines to be coaled, and plenty of coal, but no way to handle it.

As luck would have it, an American salesman, the very one who had originally shown the value of the American Railroad Ditcher to the contractor, called on the chief engineer that day. He heard about it and noticed the evident frustration of all concerned. "Why all the excitement," said he, "when you have two American Railroad Ditchers, either one capable of loading all your coal with a clam-shell?" They grabbed at the suggestion as drowning men are reputed to grab at straws. An American was quickly rigged up with a clam-shell and soon engines were being coaled as smoothly as though nothing had happened.

And that's how it happens that the slogan of a certain southwestern railroad is: "Why worry when you have an American Railroad Ditcher?"





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Bartlett Orr Press, New York







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